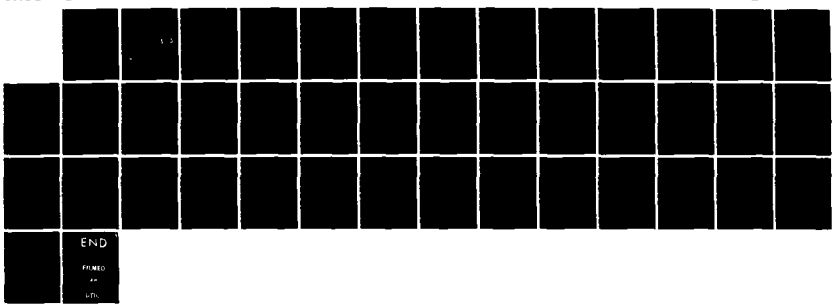
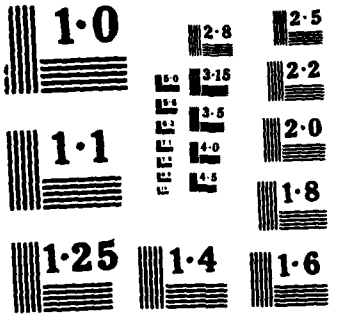
AD-A163 249 TIDAL AND LUNAR DATA FOR POINT MUGU SAN NICHOLAS ISLAND 1/1
AND THE BARKING SANDS AREA DURING 1986(U) PACIFIC
MISSILE TEST CENTER POINT MUGU CA R DIXON 31 DEC 85
UNCLASSIFIED PMTC-TP-00035 F/G 8/3 NL





Technical Publication TP000035

(12)



# TIDAL AND LUNAR DATA FOR POINT MUGU, SAN NICOLAS ISLAND, AND THE BARKING SANDS AREA DURING 1986

Compiled by
RICH DIXON
Geophysics Division



31 December 1985





PACIFIC MISSILE TEST CENTER

Point Mugu, California 93042-5000

# PACIFIC MISSILE TEST CENTER

AN ACTIVITY OF THE NAVAL AIR SYSTEMS COMMAND

**Mr. J. S. Rosenthal**, Head, Geophysical Sciences Branch; **Mr. R. W. Dixon**, Task Engineer; **Mr. D. A. Lea**, Program Manager; **Mr. P. D. Wilson**, Associate Range Operations Officer; and **CAPT C. K. Hutchinson**, Director, Range Directorate, have approved this report for publication.

**W. R. HATTABAUGH**
*Technical Director*

Technical Publication TP000035

Published by . . . . . Technical Reports Management Branch
Security classification . . . . . .UNCLASSIFIED
First printing . . . . . .250 copies

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

AD-A163249

## REPORT DOCUMENTATION PAGE

| | |
|---|---|
| 1a REPORT SECURITY CLASSIFICATION<br>UNCLASSIFIED | 1b RESTRICTIVE MARKINGS |
| 2a SECURITY CLASSIFICATION AUTHORITY | 3 DISTRIBUTION / AVAILABILITY OF REPORT<br>Approved for public release; distribution is unlimited |
| 2b DECLASSIFICATION / DOWNGRADING SCHEDULE | |
| 4 PERFORMING ORGANIZATION REPORT NUMBER(S)<br>TP000035 | 5 MONITORING ORGANIZATION REPORT NUMBER(S) |
| 6a NAME OF PERFORMING ORGANIZATION<br>Pacific Missile Test Center<br>6b OFFICE SYMBOL (If applicable)<br>Code 3250 | 7a NAME OF MONITORING ORGANIZATION |
| 6c ADDRESS (City, State, and ZIP Code)<br>Point Mugu, CA 93042-5000 | 7b ADDRESS (City, State, and ZIP Code) |
| 8a NAME OF FUNDING SPONSORING ORGANIZATION<br>8b OFFICE SYMBOL (If applicable) | 9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER |
| 8c ADDRESS (City, State and ZIP Code) | 10 SOURCE OF FUNDING NUMBERS<br>PROGRAM ELEMENT NO / PROJECT NO / TASK NO / WORK UNIT ACCESSION NO |

11 TITLE (Include Security Classification)
**TIDAL AND LUNAR DATA FOR POINT MUGU, SAN NICOLAS ISLAND, AND THE BARKING SANDS AREA DURING 1986**

12 PERSONAL AUTHOR(S)
RICH DIXON

| 13a TYPE OF REPORT | 13b TIME COVERED | 14 DATE OF REPORT (Year, Month, Day) | 15 PAGE COUNT |
|---|---|---|---|
| ANNUAL | FROM _____ TO _____ | 31 DEC 1985 | 41 |

16 SUPPLEMENTARY NOTATION

| 17 COSATI CODES | | |
|---|---|---|
| FIELD | GROUP | SUB-GROUP |
| | | |
| | | |

18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
Barking Sands, Hawaii; San Nicolas Island, California; Lunar data; Tide tables; Point Mugu, California

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

Basic lunar and tidal data for Point Mugu, San Nicolas Island, and the Barking Sands Area during 1986 are provided. The data presented are (1) tidal data, (2) times of moonrise and moonset, (3) times of lunar phases, and (4) times of sunrise and sunset.

| | |
|---|---|
| 20 DISTRIBUTION / AVAILABILITY OF ABSTRACT<br>☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS | 21 ABSTRACT SECURITY CLASSIFICATION<br>UNCLASSIFIED |
| 22a NAME OF RESPONSIBLE INDIVIDUAL<br>RICH DIXON | 22b TELEPHONE (Include Area Code)<br>(805) 989-8115<br>22c OFFICE SYMBOL<br>Code 3250 |

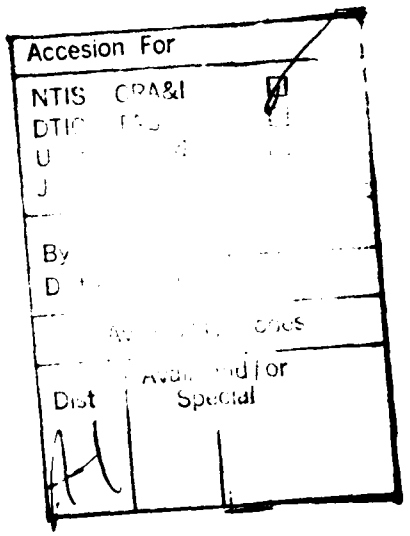
DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

## CONTENTS

## CONTENTS (Concluded)





## INTRODUCTION

This publication combines into a single source all tidal and lunar data for operational locations of the Pacific Missile Test Center for use in Calendar Year 1986.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. An appendix provides information regarding lunar phases. Since all such data change from year to year, this publication will be reissued annually.

Sunrise-sunset times for these locations, and associated solar data which do not change significantly from year to year, are issued as a single, permanent publication. Further information regarding any of these data may be obtained from the Geophysics Division of the Range Operations Department.

## DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1986.*

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST); add eight hours to obtain Greenwich Mean Time (GMT or Z).**

For the Barking Sands Area, all times listed are Alaska-Hawaii Standard Time (AHST); add ten hours to obtain GMT. Daylight Saving Time is not observed in Hawaii.

*National Ocean Survey, Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1986. Washington, D.C., GPO, 1985.

**When Daylight Savings Time (PDT) is in effect, 1 hour is to be added to the times given. In 1986, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday, 27 April (add 1 hour), and to end at 0200 PDT on Sunday, 26 October (subtract 1 hour).

## TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in table 2. The times and height of high and low tides for 1986 at Point Mugu are given in the even-numbered tables 4 through 26, and at San Nicolas Island in the odd-numbered tables 5 through 27. Similar tide data for Port Allen are given in tables 29 through 40.

Table 1. Tidal Ranges for Point Mugu and San Nicolas Island.

| Tidal Levels | Point Mugu | San Nicolas Island |
|---|---|---|
| | Height (Feet) | Height (Feet) |
| Extreme high water | 7.3 | 6.7 |
| Mean higher high water | 5.3 | 4.9 |
| Mean high water | 4.5 | 4.1 |
| Mean tide level* | 2.7 | 2.5 |
| Mean low water | 0.9 | 0.8 |
| Mean lower low water | 0.0 | 0.0 |
| Extreme low water | -2.0 | -1.8 |

*The mean tide level is also called mean sea level.

Table 2. Tidal Ranges for Port Allen.

| Tidal Levels | Height (Feet) |
|---|---|
| Extreme high water | 2.6 |
| Mean higher high water | 1.6 |
| Mean high water | 1.2 |
| Mean tide level* | 0.7 |
| Mean low water | 0.2 |
| Mean lower low water | 0.0 |
| Extreme low water | -0.4 |

*The mean tide level is also called mean sea level.

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water (see tables 1 and 2) and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and is thus likely to be higher or lower than computed values may indicate. Information regarding the height of the tide at any time will be found in appendix A.

## LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1986 are given in table 3, and for the Barking Sands area in table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1986 will be found in appendix B.

Table 3. Moonrise and Moonset, Point Mugu, California, 1986.
Pacific Standard Time

| Date | January | | February | | March | | April | | May | | June | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | |
| 1 | 2229 | 1049 | | 1048 | 2351 | 0924 | 0110 | 1043 | 0135 | 1157 | 0134 | 1356 | 1 |
| 2 | 2333 | 1117 | 0048 | 1124 | | 1004 | 0207 | 1149 | 0209 | 1302 | 0159 | 1453 | 2 |
| 3 | | 1145 | 0159 | 1205 | 0103 | 1051 | 0254 | 1258 | 0239 | 1404 | 0223 | 1550 | 3 |
| 4 | 0039 | 1215 | 0311 | 1256 | 0212 | 1147 | 0333 | 1404 | 0305 | 1503 | 0250 | 1648 | 4 |
| 5 | 0147 | 1248 | 0420 | 1355 | 0315 | 1250 | 0406 | 1508 | 0330 | 1601 | 0319 | 1747 | 5 |
| 6 | 0259 | 1326 | 0521 | 1502 | 0409 | 1358 | 0434 | 1610 | 0354 | 1658 | 0353 | 1846 | 6 |
| 7 | 0413 | 1412 | 0614 | 1612 | 0454 | 1506 | 0500 | 1709 | 0419 | 1756 | 0432 | 1943 | 7 |
| 8 | 0526 | 1508 | 0657 | 1722 | 0532 | 1614 | 0525 | 1807 | 0447 | 1855 | 0517 | 2036 | 8 |
| 9 | 0635 | 1612 | 0733 | 1829 | 0603 | 1718 | 0550 | 1905 | 0517 | 1954 | 0609 | 2125 | 9 |
| 10 | 0734 | 1723 | 0804 | 1933 | 0631 | 1819 | 0616 | 2004 | 0552 | 2052 | 0705 | 2207 | 10 |
| 11 | 0824 | 1834 | 0831 | 2033 | 0657 | 1919 | 0644 | 2103 | 0633 | 2148 | 0805 | 2245 | 11 |
| 12 | 0904 | 1943 | 0856 | 2132 | 0722 | 2017 | 0716 | 2202 | 0720 | 2240 | 0907 | 2317 | 12 |
| 13 | 0937 | 2048 | 0921 | 2230 | 0747 | 2116 | 0753 | 2300 | 0814 | 2327 | 1008 | 2346 | 13 |
| 14 | 1006 | 2149 | 0947 | 2328 | 0814 | 2214 | 0836 | 2355 | 0911 | | 1110 | | 14 |
| 15 | 1032 | 2248 | 1015 | | 0844 | 2313 | 0926 | | 1012 | 0008 | 1213 | 0014 | 15 |
| 16 | 1056 | 2345 | 1046 | 0026 | 0918 | | 1021 | 0045 | 1115 | 0044 | 1317 | 0041 | 16 |
| 17 | 1121 | | 1122 | 0125 | 0957 | 0012 | 1121 | 0131 | 1218 | 0116 | 1425 | 0109 | 17 |
| 18 | 1147 | 0042 | 1204 | 0223 | 1043 | 0109 | 1224 | 0210 | 1322 | 0145 | 1536 | 0140 | 18 |
| 19 | 1216 | 0139 | 1254 | 0319 | 1136 | 0203 | 1329 | 0245 | 1427 | 0213 | 1652 | 0216 | 19 |
| 20 | 1249 | 0237 | 1349 | 0412 | 1234 | 0252 | 1434 | 0317 | 1535 | 0241 | 1809 | 0300 | 20 |
| 21 | 1328 | 0336 | 1451 | 0500 | 1337 | 0336 | 1541 | 0346 | 1647 | 0311 | 1922 | 0353 | 21 |
| 22 | 1413 | 0434 | 1556 | 0542 | 1442 | 0414 | 1649 | 0415 | 1802 | 0345 | 2028 | 0457 | 22 |
| 23 | 1505 | 0530 | 1702 | 0619 | 1549 | 0449 | 1800 | 0445 | 1920 | 0426 | 2121 | 0609 | 23 |
| 24 | 1604 | 0621 | 1809 | 0651 | 1656 | 0520 | 1914 | 0517 | 2036 | 0515 | 2205 | 0723 | 24 |
| 25 | 1707 | 0706 | 1915 | 0721 | 1804 | 0549 | 2031 | 0554 | 2146 | 0614 | 2240 | 0836 | 25 |
| 26 | 1812 | 0746 | 2022 | 0750 | 1913 | 0618 | 2147 | 0638 | 2244 | 0721 | 2310 | 0944 | 26 |
| 27 | 1917 | 0821 | 2130 | 0819 | 2024 | 0648 | 2259 | 0730 | 2332 | 0833 | 2337 | 1047 | 27 |
| 28 | 2022 | 0852 | 2240 | 0850 | 2138 | 0722 | | 0832 | | 0944 | | 1148 | 28 |
| 29 | 2127 | 0920 | | | 2252 | 0801 | 0001 | 0939 | 0010 | 1053 | 0002 | 1246 | 29 |
| 30 | 2232 | 0948 | | | | 0847 | 0053 | 1049 | 0042 | 1157 | 0027 | 1344 | 30 |
| 31 | 2339 | 1017 | | | 0004 | 0941 | | * | 0109 | 1257 | | | 31 |

| Date | July | | August | | September | | October | | November | | December | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | |
| 1 | 0053 | 1442 | 0110 | 1626 | 0240 | 1720 | 0333 | 1650 | 0537 | 1643 | 0654 | 1643 | 1 |
| 2 | 0121 | 1541 | 0158 | 1718 | 0343 | 1753 | 0437 | 1717 | 0650 | 1721 | 0810 | 1744 | 2 |
| 3 | 0154 | 1639 | 0252 | 1804 | 0446 | 1822 | 0542 | 1745 | 0806 | 1805 | 0918 | 1854 | 3 |
| 4 | 0231 | 1737 | 0351 | 1845 | 0549 | 1850 | 0649 | 1815 | 0921 | 1859 | 1016 | 2008 | 4 |
| 5 | 0314 | 1832 | 0452 | 1921 | 0653 | 1917 | 0759 | 1848 | 1032 | 2003 | 1102 | 2122 | 5 |
| 6 | 0404 | 1922 | 0555 | 1952 | 0757 | 1944 | 0911 | 1927 | 1133 | 2113 | 1139 | 2232 | 6 |
| 7 | 0500 | 2007 | 0657 | 2020 | 0903 | 2014 | 1025 | 2013 | 1224 | 2224 | 1211 | 2337 | 7 |
| 8 | 0559 | 2046 | 0759 | 2047 | 1012 | 2048 | 1137 | 2109 | 1305 | 2334 | 1238 | | 8 |
| 9 | 0701 | 2119 | 0902 | 2114 | 1123 | 2129 | 1242 | 2213 | 1339 | | 1304 | 0040 | 9 |
| 10 | 0802 | 2149 | 1005 | 2142 | 1235 | 2217 | 1338 | 2323 | 1408 | 0041 | 1329 | 0140 | 10 |
| 11 | 0904 | 2217 | 1111 | 2212 | 1344 | 2315 | 1425 | | 1434 | 0144 | 1355 | 0239 | 11 |
| 12 | 1005 | 2243 | 1220 | 2248 | 1447 | | 1503 | 0033 | 1459 | 0245 | 1423 | 0338 | 12 |
| 13 | 1108 | 2310 | 1332 | 2331 | 1541 | 0021 | 1536 | 0142 | 1525 | 0345 | 1455 | 0438 | 13 |
| 14 | 1212 | 2339 | 1444 | | 1625 | 0132 | 1604 | 0248 | 1551 | 0445 | 1532 | 0538 | 14 |
| 15 | 1320 | | 1553 | 0023 | 1702 | 0244 | 1630 | 0351 | 1621 | 0545 | 1614 | 0637 | 15 |
| 16 | 1431 | 0012 | 1654 | 0125 | 1734 | 0353 | 1656 | 0453 | 1654 | 0645 | 1703 | 0733 | 16 |
| 17 | 1545 | 0050 | 1746 | 0235 | 1802 | 0500 | 1722 | 0554 | 1733 | 0746 | 1757 | 0823 | 17 |
| 18 | 1659 | 0138 | 1829 | 0349 | 1828 | 0604 | 1749 | 0654 | 1817 | 0844 | 1854 | 0908 | 18 |
| 19 | 1808 | 0236 | 1904 | 0501 | 1854 | 0705 | 1820 | 0755 | 1908 | 0938 | 1954 | 0947 | 19 |
| 20 | 1907 | 0344 | 1935 | 0611 | 1921 | 0806 | 1855 | 0856 | 2003 | 1027 | 2053 | 1020 | 20 |
| 21 | 1955 | 0457 | 2002 | 0717 | 1950 | 0907 | 1936 | 0956 | 2101 | 1110 | 2153 | 1050 | 21 |
| 22 | 2035 | 0612 | 2028 | 0820 | 2022 | 1008 | 2023 | 1053 | 2201 | 1147 | 2252 | 1117 | 22 |
| 23 | 2108 | 0724 | 2054 | 0921 | 2059 | 1108 | 2115 | 1145 | 2302 | 1219 | 2352 | 1142 | 23 |
| 24 | 2137 | 0831 | 2121 | 1021 | 2142 | 1207 | 2212 | 1232 | | 1248 | | 1208 | 24 |
| 25 | 2203 | 0934 | 2151 | 1121 | 2231 | 1302 | 2312 | 1313 | 0002 | 1315 | 0054 | 1235 | 25 |
| 26 | 2228 | 1035 | 2225 | 1221 | 2326 | 1353 | | 1349 | 0103 | 1341 | 0200 | 1305 | 26 |
| 27 | 2254 | 1134 | 2304 | 1320 | | 1438 | 0013 | 1420 | 0206 | 1408 | 0310 | 1341 | 27 |
| 28 | 2322 | 1233 | 2350 | 1417 | 0025 | 1517 | 0116 | 1449 | 0312 | 1438 | 0424 | 1425 | 28 |
| 29 | 2353 | 1332 | | 1511 | 0127 | 1551 | 0218 | 1516 | 0422 | 1512 | 0540 | 1520 | 29 |
| 30 | | 1431 | 0042 | 1600 | 0230 | 1622 | 0322 | 1543 | 0537 | 1552 | 0653 | 1627 | 30 |
| 31 | 0029 | 1530 | 0139 | 1643 | | | 0428 | 1612 | | | 0758 | 1741 | 31 |

**TABLE 4**

POINT MUGU TIDES
JANUARY 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0122 | 3.7 | 0606 | 2.7 | 1142 | 4.6 | 1911 | .3 |
| 2 | 0206 | 4.0 | 0737 | 2.5 | 1251 | 3.9 | 1955 | .7 |
| 3 | 0252 | 4.3 | 0920 | 2.0 | 1424 | 3.4 | 2041 | 1.2 |
| 4 | 0338 | 4.8 | 1046 | 1.3 | 1616 | 3.1 | 2140 | 1.6 |
| 5 | 0426 | 5.3 | 1155 | .5 | 1754 | 3.1 | 2235 | 1.9 |
| 6 | 0516 | 5.8 | 1250 | -.4 | 1911 | 3.3 | 2338 | 2.1 |
| 7 | 0603 | 6.2 | 1339 | -1.1 | 2007 | 3.6 | ---- | --- |
| 8 | 0033 | 2.1 | 0652 | 6.5 | 1427 | -1.4 | 2057 | 3.7 |
| 9 | 0126 | 2.1 | 0740 | 6.7 | 1512 | -1.7 | 2140 | 3.8 |
| 10 | 0217 | 2.0 | 0825 | 6.8 | 1555 | -1.7 | 2220 | 3.9 |
| 11 | 0307 | 2.0 | 0911 | 6.6 | 1637 | -1.4 | 2302 | 3.9 |
| 12 | 0355 | 2.0 | 0956 | 6.2 | 1717 | -1.2 | 2347 | 4.0 |
| 13 | 0446 | 2.0 | 1038 | 5.7 | 1755 | -.6 | ---- | --- |
| 14 | 0029 | 4.0 | 0539 | 2.1 | 1124 | 4.9 | 1832 | 0.0 |
| 15 | 0112 | 4.1 | 0648 | 2.2 | 1212 | 4.1 | 1909 | .6 |
| 16 | 0157 | 4.2 | 0807 | 2.1 | 1315 | 3.4 | 1948 | 1.2 |
| 17 | 0246 | 4.3 | 0950 | 1.9 | 1453 | 2.8 | 2027 | 1.7 |
| 18 | 0338 | 4.4 | 1119 | 1.4 | 1703 | 2.6 | 2123 | 2.2 |
| 19 | 0425 | 4.6 | 1222 | .9 | 1849 | 2.8 | 2226 | 2.5 |
| 20 | 0514 | 4.8 | 1307 | .4 | 1948 | 3.0 | 2327 | 2.6 |
| 21 | 0556 | 5.1 | 1342 | -.1 | 2024 | 3.2 | ---- | --- |
| 22 | 0020 | 2.6 | 0633 | 5.4 | 1417 | -.4 | 2052 | 3.4 |
| 23 | 0102 | 2.5 | 0710 | 5.6 | 1446 | -.7 | 2118 | 3.5 |
| 24 | 0140 | 2.3 | 0745 | 5.9 | 1516 | -.9 | 2143 | 3.6 |
| 25 | 0216 | 2.2 | 0820 | 6.0 | 1546 | -1.0 | 2208 | 3.6 |
| 26 | 0252 | 2.0 | 0855 | 6.0 | 1616 | -.9 | 2236 | 3.8 |
| 27 | 0331 | 1.9 | 0930 | 5.9 | 1644 | -.8 | 2307 | 3.9 |
| 28 | 0412 | 1.8 | 1009 | 5.5 | 1715 | -.5 | 2337 | 4.1 |
| 29 | 0502 | 1.7 | 1048 | 5.0 | 1745 | 0.0 | ---- | --- |
| 30 | 0011 | 4.3 | 0558 | 1.7 | 1137 | 4.3 | 1818 | .5 |
| 31 | 0051 | 4.5 | 0714 | 1.5 | 1239 | 3.6 | 1853 | 1.1 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 5**

SAN NICOLAS ISLAND TIDES
JANUARY 1986
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0129 | 3.4 | 0616 | 2.5 | 1149 | 4.2 | 1921 | .3 |
| 2 | 0213 | 3.7 | 0747 | 2.3 | 1258 | 3.6 | 2005 | .6 |
| 3 | 0259 | 4.0 | 0930 | 1.8 | 1431 | 3.1 | 2051 | 1.1 |
| 4 | 0345 | 4.4 | 1056 | 1.2 | 1623 | 2.8 | 2150 | 1.5 |
| 5 | 0433 | 4.8 | 1205 | .4 | 1801 | 2.8 | 2245 | 1.8 |
| 6 | 0523 | 5.3 | 1300 | -.4 | 1918 | 3.0 | 2348 | 1.9 |
| 7 | 0610 | 5.7 | 1349 | -1.0 | 2014 | 3.3 | ---- | --- |
| 8 | 0043 | 1.9 | 0659 | 6.0 | 1437 | -1.3 | 2104 | 3.4 |
| 9 | 0136 | 1.9 | 0747 | 6.2 | 1522 | -1.6 | 2147 | 3.5 |
| 10 | 0227 | 1.8 | 0832 | 6.2 | 1605 | -1.6 | 2227 | 3.6 |
| 11 | 0317 | 1.8 | 0918 | 6.1 | 1647 | -1.3 | 2309 | 3.6 |
| 12 | 0405 | 1.8 | 1003 | 5.7 | 1727 | -1.1 | 2354 | 3.7 |
| 13 | 0456 | 1.8 | 1045 | 5.2 | 1805 | -.5 | ---- | --- |
| 14 | 0036 | 3.7 | 0549 | 1.9 | 1131 | 4.5 | 1842 | 0.0 |
| 15 | 0119 | 3.8 | 0658 | 2.0 | 1219 | 3.8 | 1919 | .5 |
| 16 | 0204 | 3.9 | 0817 | 1.9 | 1322 | 3.1 | 1958 | 1.1 |
| 17 | 0253 | 4.0 | 1000 | 1.8 | 1500 | 2.6 | 2037 | 1.6 |
| 18 | 0345 | 4.0 | 1129 | 1.3 | 1710 | 2.4 | 2133 | 2.0 |
| 19 | 0432 | 4.2 | 1232 | .8 | 1856 | 2.6 | 2236 | 2.3 |
| 20 | 0521 | 4.4 | 1317 | .4 | 1955 | 2.7 | 2337 | 2.4 |
| 21 | 0603 | 4.7 | 1352 | -.1 | 2031 | 2.9 | ---- | --- |
| 22 | 0030 | 2.4 | 0640 | 4.9 | 1427 | -.4 | 2059 | 3.1 |
| 23 | 0112 | 2.3 | 0717 | 5.1 | 1456 | -.6 | 2125 | 3.2 |
| 24 | 0150 | 2.1 | 0752 | 5.4 | 1526 | -.8 | 2150 | 3.3 |
| 25 | 0226 | 2.0 | 0827 | 5.5 | 1556 | -.9 | 2215 | 3.3 |
| 26 | 0302 | 1.8 | 0902 | 5.5 | 1626 | -.8 | 2243 | 3.5 |
| 27 | 0341 | 1.8 | 0937 | 5.4 | 1654 | -.7 | 2314 | 3.6 |
| 28 | 0422 | 1.7 | 1016 | 5.0 | 1725 | -.4 | 2344 | 3.8 |
| 29 | 0512 | 1.6 | 1055 | 4.6 | 1755 | 0.0 | ---- | --- |
| 30 | 0018 | 4.0 | 0608 | 1.6 | 1144 | 4.0 | 1828 | .4 |
| 31 | 0058 | 4.1 | 0724 | 1.4 | 1246 | 3.3 | 1903 | 1.0 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 6**

POINT MUGU TIDES
FEBRUARY 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0136 | 4.7 | 0847 | 1.3 | 1422 | 2.9 | 1938 | 1.7 |
| 2 | 0239 | 4.9 | 1029 | .8 | 1644 | 2.7 | 2040 | 2.2 |
| 3 | 0346 | 5.2 | 1153 | .1 | 1836 | 2.9 | 2216 | 2.5 |
| 4 | 0453 | 5.5 | 1250 | -.6 | 1936 | 3.3 | 2339 | 2.5 |
| 5 | 0556 | 5.9 | 1337 | -1.1 | 2015 | 3.6 | ---- | --- |
| 6 | 0041 | 2.2 | 0649 | 6.2 | 1422 | -1.4 | 2050 | 3.8 |
| 7 | 0134 | 1.9 | 0738 | 6.3 | 1458 | -1.5 | 2122 | 4.0 |
| 8 | 0221 | 1.6 | 0823 | 6.3 | 1534 | -1.4 | 2151 | 4.2 |
| 9 | 0306 | 1.4 | 0902 | 6.1 | 1609 | -1.2 | 2223 | 4.3 |
| 10 | 0348 | 1.3 | 0944 | 5.8 | 1638 | -.8 | 2254 | 4.4 |
| 11 | 0429 | 1.2 | 1019 | 5.2 | 1707 | -.2 | 2326 | 4.4 |
| 12 | 0514 | 1.3 | 1059 | 4.5 | 1735 | .4 | 2355 | 4.4 |
| 13 | 0605 | 1.4 | 1141 | 3.8 | 1800 | 1.0 | ---- | --- |
| 14 | 0027 | 4.3 | 0704 | 1.5 | 1232 | 3.1 | 1820 | 1.5 |
| 15 | 0106 | 4.2 | 0830 | 1.5 | 1401 | 2.5 | 1834 | 2.1 |
| 16 | 0154 | 4.1 | 1026 | 1.3 | ---- | --- | ---- | --- |
| 17 | 0306 | 4.1 | 1153 | .9 | ---- | --- | ---- | --- |
| 18 | 0426 | 4.3 | 1244 | .4 | 2000 | 3.1 | 2319 | 2.9 |
| 19 | 0530 | 4.6 | 1321 | 0.0 | 2009 | 3.3 | ---- | --- |
| 20 | 0015 | 2.6 | 0615 | 5.0 | 1350 | -.4 | 2027 | 3.5 |
| 21 | 0057 | 2.3 | 0657 | 5.4 | 1418 | -.7 | 2045 | 3.6 |
| 22 | 0134 | 2.0 | 0733 | 5.7 | 1447 | -.9 | 2104 | 3.8 |
| 23 | 0209 | 1.6 | 0808 | 5.8 | 1512 | -.9 | 2125 | 4.1 |
| 24 | 0245 | 1.3 | 0843 | 5.8 | 1540 | -.8 | 2150 | 4.3 |
| 25 | 0324 | 1.1 | 0922 | 5.6 | 1606 | -.6 | 2216 | 4.6 |
| 26 | 0406 | .8 | 1001 | 5.2 | 1635 | -.1 | 2243 | 4.8 |
| 27 | 0454 | .7 | 1046 | 4.5 | 1704 | .4 | 2318 | 5.0 |
| 28 | 0550 | .6 | 1139 | 3.8 | 1733 | 1.1 | 2358 | 5.0 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 7**

SAN NICOLAS ISLAND TIDES
FEBRUARY 1986
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0143 | 4.3 | 0857 | 1.2 | 1429 | 2.6 | 1948 | 1.6 |
| 2 | 0246 | 4.5 | 1039 | .7 | 1651 | 2.5 | 2050 | 2.0 |
| 3 | 0353 | 4.8 | 1203 | .1 | 1843 | 2.6 | 2226 | 2.3 |
| 4 | 0500 | 5.0 | 1300 | -.5 | 1943 | 3.0 | 2349 | 2.3 |
| 5 | 0603 | 5.4 | 1347 | -1.0 | 2022 | 3.3 | ---- | --- |
| 6 | 0051 | 2.0 | 0656 | 5.7 | 1432 | -1.3 | 2057 | 3.5 |
| 7 | 0144 | 1.8 | 0745 | 5.8 | 1508 | -1.4 | 2129 | 3.7 |
| 8 | 0231 | 1.5 | 0830 | 5.8 | 1544 | -1.3 | 2158 | 3.9 |
| 9 | 0316 | 1.3 | 0909 | 5.6 | 1619 | -1.1 | 2230 | 4.0 |
| 10 | 0358 | 1.2 | 0951 | 5.3 | 1648 | -.7 | 2301 | 4.0 |
| 11 | 0438 | 1.1 | 1026 | 4.8 | 1717 | -.2 | 2333 | 4.0 |
| 12 | 0524 | 1.2 | 1106 | 4.1 | 1745 | .4 | 0002 | 4.0* |
| 13 | 0615 | 1.3 | 1148 | 3.5 | 1810 | .9 | ---- | --- |
| 14 | 0034 | 4.0 | 0714 | 1.4 | 1239 | 2.8 | 1830 | 1.4 |
| 15 | 0113 | 3.9 | 0840 | 1.4 | 1408 | 2.3 | 1844 | 1.9 |
| 16 | 0201 | 3.8 | 1036 | 1.2 | ---- | --- | ---- | --- |
| 17 | 0313 | 3.8 | 1203 | .8 | ---- | --- | ---- | --- |
| 18 | 0433 | 4.0 | 1254 | .4 | 2007 | 2.8 | 2329 | 2.6 |
| 19 | 0537 | 4.2 | 1331 | 0.0 | 2016 | 3.0 | ---- | --- |
| 20 | 0025 | 2.4 | 0622 | 4.6 | 1400 | -.4 | 2034 | 3.2 |
| 21 | 0107 | 2.1 | 0704 | 4.9 | 1428 | -.6 | 2052 | 3.3 |
| 22 | 0144 | 1.8 | 0740 | 5.2 | 1457 | -.8 | 2111 | 3.5 |
| 23 | 0219 | 1.5 | 0815 | 5.3 | 1522 | -.8 | 2132 | 3.8 |
| 24 | 0255 | 1.2 | 0850 | 5.3 | 1550 | -.7 | 2157 | 4.0 |
| 25 | 0334 | 1.0 | 0929 | 5.1 | 1616 | -.5 | 2223 | 4.2 |
| 26 | 0416 | .7 | 1008 | 4.8 | 1645 | -.1 | 2250 | 4.4 |
| 27 | 0504 | .6 | 1053 | 4.1 | 1714 | .4 | 2325 | 4.6 |
| 28 | 0600 | .5 | 1146 | 3.5 | 1743 | 1.0 | 0005 | 4.6* |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 8**

POINT MUGU TIDES
MARCH 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0659 | .6 | 1253 | 3.1 | 1803 | 1.6 | ---- | --- |
| 2 | 0044 | 5.0 | 0832 | .6 | 1500 | 2.6 | 1842 | 2.2 |
| 3 | 0154 | 4.9 | 1018 | .3 | 1754 | 2.8 | 2012 | 2.7 |
| 4 | 0322 | 4.9 | 1140 | -.3 | 1855 | 3.2 | 2238 | 2.8 |
| 5 | 0446 | 5.1 | 1238 | -.7 | 1925 | 3.6 | 0001 | 2.4* |
| 6 | 0555 | 5.5 | 1323 | -1.0 | 1955 | 3.8 | ---- | --- |
| 7 | 0054 | 1.9 | 0648 | 5.7 | 1400 | -1.2 | 2022 | 4.1 |
| 8 | 0139 | 1.4 | 0734 | 5.8 | 1434 | -1.1 | 2049 | 4.4 |
| 9 | 0220 | 1.1 | 0815 | 5.7 | 1503 | -.9 | 2112 | 4.6 |
| 10 | 0257 | .8 | 0853 | 5.5 | 1531 | -.5 | 2137 | 4.7 |
| 11 | 0334 | .6 | 0929 | 5.1 | 1556 | -.1 | 2202 | 4.8 |
| 12 | 0412 | .6 | 1004 | 4.6 | 1617 | .4 | 2224 | 4.8 |
| 13 | 0450 | .6 | 1041 | 4.0 | 1640 | 1.0 | 2249 | 4.7 |
| 14 | 0530 | .7 | 1121 | 3.5 | 1657 | 1.4 | 2313 | 4.6 |
| 15 | 0618 | .9 | 1213 | 2.9 | 1706 | 1.9 | 2339 | 4.4 |
| 16 | 0727 | 1.1 | 1354 | 2.4 | 1650 | 2.3 | ---- | --- |
| 17 | 0021 | 4.1 | 0917 | 1.1 | ---- | --- | ---- | --- |
| 18 | 0129 | 3.9 | 1100 | .8 | ---- | --- | ---- | --- |
| 19 | 0328 | 3.9 | 1201 | .4 | 1930 | 3.3 | 2313 | 2.9 |
| 20 | 0452 | 4.2 | 1239 | 0.0 | 1932 | 3.5 | 0007 | 2.5* |
| 21 | 0546 | 4.6 | 1308 | -.3 | 1941 | 3.6 | ---- | --- |
| 22 | 0044 | 2.0 | 0632 | 5.0 | 1336 | -.5 | 1956 | 4.0 |
| 23 | 0121 | 1.5 | 0710 | 5.2 | 1405 | -.6 | 2014 | 4.3 |
| 24 | 0156 | 1.0 | 0750 | 5.4 | 1430 | -.5 | 2036 | 4.7 |
| 25 | 0235 | .5 | 0831 | 5.3 | 1459 | -.3 | 2101 | 5.1 |
| 26 | 0314 | 0.0 | 0913 | 5.0 | 1524 | 0.0 | 2130 | 5.4 |
| 27 | 0400 | -.3 | 0959 | 4.6 | 1555 | .5 | 2201 | 5.6 |
| 28 | 0449 | -.5 | 1051 | 4.0 | 1625 | 1.1 | 2236 | 5.6 |
| 29 | 0544 | -.4 | 1157 | 3.4 | 1656 | 1.6 | 2318 | 5.4 |
| 30 | 0653 | -.2 | 1328 | 2.9 | 1734 | 2.2 | ---- | --- |
| 31 | 0011 | 5.1 | 0823 | -.1 | 1559 | 2.8 | 1824 | 2.7 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 9**

SAN NICOLAS ISLAND TIDES
MARCH 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0709 | .5 | 1300 | 2.8 | 1813 | 1.5 | ---- | --- |
| 2 | 0051 | 4.6 | 0842 | .5 | 1507 | 2.4 | 1852 | 2.0 |
| 3 | 0201 | 4.5 | 1028 | .3 | 1801 | 2.6 | 2022 | 2.5 |
| 4 | 0329 | 4.5 | 1150 | -.3 | 1902 | 2.9 | 2248 | 2.6 |
| 5 | 0453 | 4.7 | 1248 | -.6 | 1932 | 3.3 | 0011 | 2.2* |
| 6 | 0602 | 5.0 | 1333 | -.9 | 2002 | 3.5 | ---- | --- |
| 7 | 0104 | 1.8 | 0655 | 5.2 | 1410 | -1.1 | 2029 | 3.8 |
| 8 | 0149 | 1.3 | 0741 | 5.3 | 1444 | -1.0 | 2056 | 4.0 |
| 9 | 0230 | 1.0 | 0822 | 5.2 | 1513 | -.8 | 2119 | 4.2 |
| 10 | 0307 | .7 | 0900 | 5.0 | 1541 | -.4 | 2144 | 4.3 |
| 11 | 0344 | .5 | 0936 | 4.7 | 1606 | -.1 | 2209 | 4.4 |
| 12 | 0422 | .5 | 1011 | 4.2 | 1627 | .4 | 2231 | 4.4 |
| 13 | 0500 | .5 | 1048 | 3.7 | 1650 | .9 | 2256 | 4.3 |
| 14 | 0540 | .6 | 1128 | 3.2 | 1707 | 1.3 | 2320 | 4.2 |
| 15 | 0628 | .8 | 1220 | 2.6 | 1716 | 1.8 | 2346 | 4.0 |
| 16 | 0737 | 1.0 | 1401 | 2.2 | 1700 | 2.1 | ---- | --- |
| 17 | 0028 | 3.8 | 0927 | 1.0 | ---- | --- | ---- | --- |
| 18 | 0136 | 3.6 | 1110 | .7 | ---- | --- | ---- | --- |
| 19 | 0335 | 3.6 | 1211 | .4 | 1937 | 3.0 | 2323 | 2.6 |
| 20 | 0459 | 3.9 | 1249 | 0.0 | 1939 | 3.2 | 0017 | 2.3* |
| 21 | 0553 | 4.2 | 1318 | -.3 | 1948 | 3.3 | ---- | --- |
| 22 | 0054 | 1.8 | 0639 | 4.6 | 1346 | -.4 | 2003 | 3.7 |
| 23 | 0131 | 1.4 | 0717 | 4.8 | 1415 | -.5 | 2021 | 4.0 |
| 24 | 0206 | .9 | 0757 | 4.9 | 1440 | -.4 | 2043 | 4.3 |
| 25 | 0245 | .4 | 0838 | 4.8 | 1509 | -.3 | 2108 | 4.7 |
| 26 | 0324 | 0.0 | 0920 | 4.6 | 1534 | 0.0 | 2137 | 4.9 |
| 27 | 0410 | -.3 | 1006 | 4.2 | 1605 | .4 | 2208 | 5.1 |
| 28 | 0459 | -.4 | 1058 | 3.7 | 1635 | 1.0 | 2243 | 5.1 |
| 29 | 0554 | -.4 | 1204 | 3.1 | 1706 | 1.5 | 2325 | 4.9 |
| 30 | 0703 | -.2 | 1335 | 2.6 | 1744 | 2.0 | ---- | --- |
| 31 | 0018 | 4.7 | 0833 | -.1 | 1606 | 2.6 | 1834 | 2.5 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 10**

POINT MUGU TIDES
APRIL 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0128 | 4.8 | 0957 | -.2 | 1745 | 3.2 | 2103 | 2.9 |
| 2 | 0308 | 4.6 | 1116 | -.4 | 1824 | 3.6 | 2300 | 2.6 |
| 3 | 0439 | 4.7 | 1209 | -.6 | 1854 | 3.9 | 0007 | 2.0* |
| 4 | 0546 | 4.9 | 1252 | -.7 | 1921 | 4.2 | ---- | --- |
| 5 | 0054 | 1.4 | 0638 | 5.0 | 1327 | -.6 | 1946 | 4.5 |
| 6 | 0135 | 1.0 | 0724 | 5.0 | 1359 | -.3 | 2008 | 4.8 |
| 7 | 0214 | .5 | 0803 | 4.8 | 1424 | 0.0 | 2030 | 5.0 |
| 8 | 0250 | .2 | 0841 | 4.6 | 1448 | .4 | 2051 | 5.1 |
| 9 | 0321 | 0.0 | 0917 | 4.2 | 1510 | .8 | 2112 | 5.2 |
| 10 | 0353 | -.1 | 0953 | 3.8 | 1531 | 1.2 | 2135 | 5.1 |
| 11 | 0429 | -.1 | 1034 | 3.5 | 1547 | 1.5 | 2156 | 5.0 |
| 12 | 0510 | .1 | 1120 | 3.1 | 1605 | 1.9 | 2219 | 4.8 |
| 13 | 0552 | .3 | 1221 | 2.7 | 1613 | 2.2 | 2249 | 4.6 |
| 14 | 0652 | .5 | 2323 | 4.3 | ---- | --- | ---- | --- |
| 15 | 0818 | .7 | ---- | --- | ---- | --- | ---- | --- |
| 16 | 0023 | 4.0 | 0949 | .6 | ---- | --- | ---- | --- |
| 17 | 0215 | 3.8 | 1055 | .4 | 1832 | 3.4 | 2247 | 2.9 |
| 18 | 0358 | 3.9 | 1140 | .2 | 1833 | 3.6 | 2343 | 2.3 |
| 19 | 0504 | 4.2 | 1212 | 0.0 | 1845 | 4.0 | ---- | --- |
| 20 | 0024 | 1.7 | 0559 | 4.4 | 1244 | -.1 | 1903 | 4.4 |
| 21 | 0102 | 1.0 | 0648 | 4.6 | 1313 | 0.0 | 1922 | 4.9 |
| 22 | 0142 | .3 | 0734 | 4.6 | 1342 | .2 | 1950 | 5.4 |
| 23 | 0221 | -.4 | 0822 | 4.6 | 1414 | .5 | 2018 | 5.8 |
| 24 | 0306 | -.9 | 0911 | 4.3 | 1447 | .9 | 2051 | 6.0 |
| 25 | 0351 | -1.2 | 1004 | 4.0 | 1519 | 1.2 | 2126 | 6.1 |
| 26 | 0444 | -1.2 | 1105 | 3.6 | 1556 | 1.7 | 2209 | 6.0 |
| 27 | 0542 | -1.2 | 1219 | 3.3 | 1637 | 2.2 | 2256 | 5.7 |
| 28 | 0648 | -.9 | 1356 | 3.1 | 1729 | 2.6 | 2355 | 5.2 |
| 29 | 0807 | -.6 | 1541 | 3.3 | 1908 | 2.9 | ---- | --- |
| 30 | 0116 | 4.7 | 0925 | -.5 | 1652 | 3.6 | 2122 | 2.8 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 11**

SAN NICOLAS ISLAND TIDES
APRIL 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0135 | 4.4 | 1007 | -.2 | 1752 | 2.9 | 2113 | 2.6 |
| 2 | 0315 | 4.2 | 1126 | -.4 | 1831 | 3.3 | 2310 | 2.4 |
| 3 | 0446 | 4.3 | 1219 | -.5 | 1901 | 3.6 | 0017 | 1.8* |
| 4 | 0553 | 4.5 | 1302 | -.6 | 1928 | 3.9 | ---- | --- |
| 5 | 0104 | 1.3 | 0645 | 4.6 | 1337 | -.5 | 1953 | 4.1 |
| 6 | 0145 | .9 | 0731 | 4.6 | 1409 | -.3 | 2015 | 4.4 |
| 7 | 0224 | .4 | 0810 | 4.4 | 1434 | 0.0 | 2037 | 4.6 |
| 8 | 0300 | .2 | 0848 | 4.2 | 1458 | .4 | 2058 | 4.7 |
| 9 | 0331 | 0.0 | 0924 | 3.9 | 1520 | .7 | 2119 | 4.8 |
| 10 | 0403 | -.1 | 1000 | 3.5 | 1541 | 1.1 | 2142 | 4.7 |
| 11 | 0439 | -.1 | 1041 | 3.2 | 1557 | 1.4 | 2203 | 4.6 |
| 12 | 0520 | .1 | 1127 | 2.8 | 1615 | 1.8 | 2226 | 4.4 |
| 13 | 0602 | .3 | 1228 | 2.5 | 1623 | 2.0 | 2256 | 4.2 |
| 14 | 0702 | .4 | 2330 | 4.0 | ---- | --- | ---- | --- |
| 15 | 0828 | .6 | ---- | --- | ---- | --- | ---- | --- |
| 16 | 0030 | 3.7 | 0959 | .5 | ---- | --- | ---- | --- |
| 17 | 0222 | 3.5 | 1105 | .4 | 1839 | 3.1 | 2257 | 2.6 |
| 18 | 0405 | 3.6 | 1150 | .2 | 1840 | 3.3 | 2353 | 2.1 |
| 19 | 0511 | 3.9 | 1222 | 0.0 | 1852 | 3.7 | ---- | --- |
| 20 | 0034 | 1.6 | 0606 | 4.0 | 1254 | -.1 | 1910 | 4.0 |
| 21 | 0112 | .9 | 0655 | 4.2 | 1323 | 0.0 | 1929 | 4.5 |
| 22 | 0152 | .3 | 0741 | 4.2 | 1352 | .2 | 1957 | 4.9 |
| 23 | 0231 | -.4 | 0829 | 4.2 | 1424 | .4 | 2025 | 5.3 |
| 24 | 0316 | -.8 | 0918 | 4.0 | 1457 | .8 | 2058 | 5.5 |
| 25 | 0401 | -1.1 | 1011 | 3.7 | 1529 | 1.1 | 2133 | 5.6 |
| 26 | 0454 | -1.1 | 1112 | 3.3 | 1606 | 1.6 | 2216 | 5.5 |
| 27 | 0552 | -1.1 | 1226 | 3.0 | 1647 | 2.0 | 2303 | 5.2 |
| 28 | 0658 | -.8 | 1403 | 2.8 | 1739 | 2.4 | 0002 | 4.8* |
| 29 | 0817 | -.5 | 1548 | 3.0 | 1918 | 2.6 | ---- | --- |
| 30 | 0123 | 4.3 | 0935 | -.4 | 1659 | 3.3 | 2132 | 2.6 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 12**

POINT MUGU TIDES
MAY 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0252 | 4.4 | 1032 | -.4 | 1734 | 3.9 | 2300 | 2.3 |
| 2 | 0418 | 4.3 | 1127 | -.2 | 1809 | 4.3 | 2359 | 1.6 |
| 3 | 0529 | 4.2 | 1209 | 0.0 | 1838 | 4.7 | ---- | --- |
| 4 | 0048 | 1.1 | 0626 | 4.2 | 1243 | .2 | 1902 | 4.9 |
| 5 | 0129 | .6 | 0713 | 4.1 | 1314 | .6 | 1925 | 5.2 |
| 6 | 0206 | .1 | 0758 | 3.9 | 1340 | .9 | 1947 | 5.3 |
| 7 | 0238 | -.2 | 0837 | 3.7 | 1402 | 1.2 | 2007 | 5.4 |
| 8 | 0309 | -.4 | 0916 | 3.6 | 1424 | 1.5 | 2029 | 5.5 |
| 9 | 0343 | -.4 | 0956 | 3.4 | 1446 | 1.8 | 2054 | 5.4 |
| 10 | 0417 | -.4 | 1038 | 3.2 | 1507 | 2.1 | 2119 | 5.3 |
| 11 | 0457 | -.3 | 1127 | 3.0 | 1526 | 2.3 | 2148 | 5.1 |
| 12 | 0541 | -.1 | 1239 | 2.8 | 1545 | 2.6 | 2220 | 4.9 |
| 13 | 0632 | .1 | 2259 | 4.6 | ---- | --- | ---- | --- |
| 14 | 0735 | .2 | 2356 | 4.2 | ---- | --- | ---- | --- |
| 15 | 0838 | .3 | 1657 | 3.3 | 1953 | 3.2 | ---- | --- |
| 16 | 0119 | 3.9 | 0935 | .3 | 1708 | 3.6 | 2157 | 2.8 |
| 17 | 0255 | 3.7 | 1024 | .4 | 1724 | 3.9 | 2307 | 2.2 |
| 18 | 0418 | 3.7 | 1103 | .4 | 1742 | 4.4 | 2356 | 1.4 |
| 19 | 0527 | 3.8 | 1140 | .6 | 1807 | 5.0 | ---- | --- |
| 20 | 0041 | .6 | 0629 | 3.9 | 1219 | .8 | 1836 | 5.5 |
| 21 | 0126 | -.3 | 0726 | 3.9 | 1254 | 1.0 | 1908 | 6.0 |
| 22 | 0212 | -1.0 | 0819 | 3.9 | 1334 | 1.2 | 1944 | 6.3 |
| 23 | 0300 | -1.4 | 0915 | 3.8 | 1412 | 1.5 | 2024 | 6.5 |
| 24 | 0350 | -1.6 | 1012 | 3.6 | 1454 | 1.8 | 2106 | 6.5 |
| 25 | 0441 | -1.6 | 1115 | 3.6 | 1539 | 2.1 | 2153 | 6.3 |
| 26 | 0537 | -1.4 | 1226 | 3.5 | 1635 | 2.4 | 2246 | 6.0 |
| 27 | 0637 | -1.2 | 1338 | 3.5 | 1744 | 2.7 | 2348 | 5.4 |
| 28 | 0741 | -.8 | 1451 | 3.6 | 1920 | 2.8 | ---- | --- |
| 29 | 0057 | 4.7 | 0843 | -.4 | 1550 | 3.9 | 2105 | 2.6 |
| 30 | 0223 | 4.2 | 0941 | 0.0 | 1638 | 4.3 | 2235 | 2.0 |
| 31 | 0349 | 3.8 | 1032 | .4 | 1716 | 4.7 | 2340 | 1.4 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 13**

SAN NICOLAS ISLAND TIDES
MAY 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0259 | 4.0 | 1042 | -.4 | 1741 | 3.6 | 2310 | 2.1 |
| 2 | 0425 | 4.0 | 1137 | -.2 | 1816 | 4.0 | 0009 | 1.5* |
| 3 | 0536 | 3.9 | 1219 | 0.0 | 1845 | 4.3 | ---- | --- |
| 4 | 0058 | 1.0 | 0633 | 3.9 | 1253 | .2 | 1909 | 4.5 |
| 5 | 0139 | .5 | 0720 | 3.8 | 1324 | .5 | 1932 | 4.8 |
| 6 | 0216 | .1 | 0805 | 3.6 | 1350 | .8 | 1954 | 4.8 |
| 7 | 0248 | -.2 | 0844 | 3.4 | 1412 | 1.1 | 2014 | 4.9 |
| 8 | 0319 | -.4 | 0923 | 3.3 | 1434 | 1.4 | 2036 | 5.0 |
| 9 | 0353 | -.4 | 1003 | 3.1 | 1456 | 1.7 | 2101 | 4.9 |
| 10 | 0427 | -.4 | 1045 | 2.9 | 1517 | 1.9 | 2126 | 4.8 |
| 11 | 0507 | -.3 | 1134 | 2.7 | 1536 | 2.1 | 2155 | 4.7 |
| 12 | 0551 | -.1 | 1246 | 2.6 | 1555 | 2.4 | 2227 | 4.5 |
| 13 | 0642 | .1 | 2306 | 4.2 | ---- | --- | ---- | --- |
| 14 | 0745 | .2 | 0003 | 3.9 | ---- | --- | ---- | --- |
| 15 | 0848 | .3 | 1704 | 3.0 | 2003 | 2.9 | ---- | --- |
| 16 | 0126 | 3.6 | 0945 | .3 | 1715 | 3.3 | 2207 | 2.6 |
| 17 | 0302 | 3.4 | 1034 | .4 | 1731 | 3.6 | 2317 | 2.0 |
| 18 | 0425 | 3.4 | 1113 | .4 | 1749 | 4.0 | 0006 | 1.3* |
| 19 | 0534 | 3.5 | 1150 | .5 | 1814 | 4.6 | ---- | --- |
| 20 | 0051 | .5 | 0636 | 3.6 | 1229 | .7 | 1843 | 5.0 |
| 21 | 0136 | -.3 | 0733 | 3.6 | 1304 | .9 | 1915 | 5.5 |
| 22 | 0222 | -.9 | 0826 | 3.6 | 1344 | 1.1 | 1951 | 5.8 |
| 23 | 0310 | -1.3 | 0922 | 3.5 | 1422 | 1.4 | 2031 | 6.0 |
| 24 | 0400 | -1.5 | 1019 | 3.3 | 1504 | 1.7 | 2113 | 6.0 |
| 25 | 0451 | -1.5 | 1122 | 3.3 | 1549 | 1.9 | 2200 | 5.8 |
| 26 | 0547 | -1.3 | 1233 | 3.2 | 1645 | 2.2 | 2253 | 5.5 |
| 27 | 0647 | -1.1 | 1345 | 3.2 | 1754 | 2.5 | 2355 | 4.9 |
| 28 | 0751 | -.7 | 1458 | 3.3 | 1930 | 2.6 | ---- | --- |
| 29 | 0104 | 4.3 | 0853 | -.4 | 1557 | 3.6 | 2115 | 2.4 |
| 30 | 0230 | 3.9 | 0951 | 0.0 | 1645 | 4.0 | 2245 | 1.8 |
| 31 | 0356 | 3.5 | 1042 | .4 | 1723 | 4.3 | 2350 | 1.3 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 14**

POINT MUGU TIDES
JUNE 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0505 | 3.6 | 1116 | .8 | 1749 | 5.0 | ---- | --- |
| 2 | 0036 | .9 | 0610 | 3.5 | 1154 | 1.2 | 1817 | 5.2 |
| 3 | 0118 | .4 | 0710 | 3.4 | 1226 | 1.4 | 1842 | 5.4 |
| 4 | 0154 | 0.0 | 0758 | 3.4 | 1254 | 1.7 | 1908 | 5.5 |
| 5 | 0229 | -.3 | 0843 | 3.4 | 1323 | 2.0 | 1933 | 5.6 |
| 6 | 0304 | -.5 | 0924 | 3.3 | 1348 | 2.2 | 2001 | 5.7 |
| 7 | 0336 | -.6 | 1004 | 3.3 | 1417 | 2.3 | 2030 | 5.6 |
| 8 | 0411 | -.6 | 1046 | 3.2 | 1445 | 2.5 | 2101 | 5.6 |
| 9 | 0449 | -.5 | 1134 | 3.2 | 1517 | 2.6 | 2135 | 5.4 |
| 10 | 0528 | -.4 | 1227 | 3.2 | 1548 | 2.8 | 2210 | 5.2 |
| 11 | 0611 | -.2 | 1322 | 3.2 | 1641 | 2.9 | 2249 | 4.9 |
| 12 | 0653 | 0.0 | 1417 | 3.4 | 1750 | 3.0 | 2339 | 4.5 |
| 13 | 0736 | .2 | 1459 | 3.6 | 1928 | 3.0 | ---- | --- |
| 14 | 0043 | 4.1 | 0825 | .4 | 1536 | 3.9 | 2112 | 2.6 |
| 15 | 0206 | 3.6 | 0910 | .7 | 1607 | 4.3 | 2231 | 1.9 |
| 16 | 0339 | 3.4 | 0956 | 1.0 | 1639 | 4.9 | 2337 | 1.2 |
| 17 | 0508 | 3.3 | 1042 | 1.2 | 1716 | 5.4 | ---- | --- |
| 18 | 0028 | .3 | 0623 | 3.4 | 1130 | 1.5 | 1756 | 6.0 |
| 19 | 0118 | -.6 | 0729 | 3.5 | 1215 | 1.8 | 1838 | 6.4 |
| 20 | 0207 | -1.2 | 0829 | 3.6 | 1307 | 1.9 | 1921 | 6.7 |
| 21 | 0255 | -1.6 | 0924 | 3.6 | 1353 | 2.1 | 2007 | 6.9 |
| 22 | 0344 | -1.7 | 1015 | 3.7 | 1445 | 2.1 | 2056 | 7.0 |
| 23 | 0433 | -1.7 | 1108 | 3.7 | 1537 | 2.2 | 2148 | 6.5 |
| 24 | 0523 | -1.4 | 1202 | 3.8 | 1636 | 2.3 | 2237 | 6.0 |
| 25 | 0613 | -1.1 | 1256 | 3.9 | 1742 | 2.4 | 2334 | 5.5 |
| 26 | 0659 | -.6 | 1351 | 4.1 | 1859 | 2.5 | ---- | --- |
| 27 | 0032 | 4.7 | 0749 | 0.0 | 1443 | 4.3 | 2030 | 2.3 |
| 28 | 0144 | 4.0 | 0838 | .6 | 1531 | 4.5 | 2202 | 1.9 |
| 29 | 0307 | 3.5 | 0924 | 1.2 | 1618 | 4.8 | 2315 | 1.4 |
| 30 | 0444 | 3.1 | 1013 | 1.6 | 1656 | 5.0 | ---- | --- |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 15**

SAN NICOLAS ISLAND TIDES
JUNE 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0512 | 3.3 | 1126 | .7 | 1756 | 4.6 | ---- | --- |
| 2 | 0046 | .8 | 0617 | 3.2 | 1204 | 1.1 | 1824 | 4.8 |
| 3 | 0128 | .4 | 0717 | 3.1 | 1236 | 1.3 | 1849 | 4.9 |
| 4 | 0204 | 0.0 | 0805 | 3.1 | 1304 | 1.6 | 1915 | 5.0 |
| 5 | 0239 | -.3 | 0850 | 3.1 | 1333 | 1.8 | 1940 | 5.1 |
| 6 | 0314 | -.4 | 0931 | 3.0 | 1358 | 2.0 | 2008 | 5.2 |
| 7 | 0346 | -.5 | 1011 | 3.0 | 1427 | 2.1 | 2037 | 5.1 |
| 8 | 0421 | -.5 | 1053 | 2.9 | 1455 | 2.3 | 2108 | 5.1 |
| 9 | 0459 | -.4 | 1141 | 2.9 | 1527 | 2.4 | 2142 | 4.9 |
| 10 | 0538 | -.4 | 1234 | 2.9 | 1558 | 2.6 | 2217 | 4.8 |
| 11 | 0621 | -.2 | 1329 | 2.9 | 1651 | 2.6 | 2256 | 4.5 |
| 12 | 0703 | 0.0 | 1424 | 3.1 | 1800 | 2.7 | 2346 | 4.1 |
| 13 | 0746 | .2 | 1506 | 3.3 | 1938 | 2.7 | ---- | --- |
| 14 | 0050 | 3.8 | 0835 | .4 | 1543 | 3.6 | 2122 | 2.4 |
| 15 | 0213 | 3.3 | 0920 | .6 | 1614 | 4.0 | 2241 | 1.8 |
| 16 | 0346 | 3.1 | 1006 | .9 | 1646 | 4.5 | 2347 | 1.1 |
| 17 | 0515 | 3.0 | 1052 | 1.1 | 1723 | 4.9 | ---- | --- |
| 18 | 0038 | .3 | 0630 | 3.1 | 1140 | 1.4 | 1803 | 5.5 |
| 19 | 0128 | -.5 | 0736 | 3.2 | 1225 | 1.7 | 1845 | 5.9 |
| 20 | 0217 | -1.1 | 0836 | 3.3 | 1317 | 1.8 | 1928 | 6.2 |
| 21 | 0305 | -1.5 | 0931 | 3.3 | 1403 | 1.9 | 2014 | 6.3 |
| 22 | 0354 | -1.6 | 1022 | 3.4 | 1455 | 1.9 | 2103 | 6.4 |
| 23 | 0443 | -1.6 | 1115 | 3.4 | 1547 | 2.0 | 2155 | 6.0 |
| 24 | 0533 | -1.3 | 1209 | 3.5 | 1646 | 2.1 | 2244 | 5.5 |
| 25 | 0623 | -1.0 | 1303 | 3.6 | 1752 | 2.2 | 2341 | 5.0 |
| 26 | 0709 | -.5 | 1358 | 3.8 | 1909 | 2.3 | ---- | --- |
| 27 | 0039 | 4.3 | 0759 | 0.0 | 1450 | 4.0 | 2040 | 2.1 |
| 28 | 0151 | 3.7 | 0848 | .5 | 1538 | 4.1 | 2212 | 1.8 |
| 29 | 0314 | 3.2 | 0934 | 1.1 | 1625 | 4.4 | 2325 | 1.3 |
| 30 | 0451 | 2.8 | 1023 | 1.5 | 1703 | 4.6 | ---- | --- |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 16**

POINT MUGU TIDES
JULY 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0017 | .9 | 0609 | 3.1 | 1058 | 2.0 | 1732 | 5.2 |
| 2 | 0105 | .5 | 0718 | 3.1 | 1140 | 2.3 | 1808 | 5.4 |
| 3 | 0145 | .1 | 0809 | 3.3 | 1222 | 2.4 | 1840 | 5.6 |
| 4 | 0220 | -.2 | 0851 | 3.3 | 1257 | 2.5 | 1915 | 5.7 |
| 5 | 0252 | -.4 | 0927 | 3.4 | 1333 | 2.6 | 1947 | 5.8 |
| 6 | 0326 | -.5 | 1001 | 3.5 | 1408 | 2.5 | 2019 | 5.9 |
| 7 | 0359 | -.6 | 1031 | 3.5 | 1444 | 2.5 | 2054 | 5.9 |
| 8 | 0430 | -.6 | 1107 | 3.6 | 1522 | 2.6 | 2129 | 5.8 |
| 9 | 0504 | -.5 | 1141 | 3.6 | 1602 | 2.6 | 2201 | 5.5 |
| 10 | 0536 | -.3 | 1216 | 3.7 | 1649 | 2.6 | 2240 | 5.2 |
| 11 | 0608 | 0.0 | 1251 | 3.8 | 1749 | 2.6 | 2326 | 4.7 |
| 12 | 0643 | .3 | 1330 | 4.1 | 1859 | 2.5 | ---- | --- |
| 13 | 0019 | 4.1 | 0718 | .8 | 1409 | 4.4 | 2029 | 2.1 |
| 14 | 0137 | 3.5 | 0801 | 1.2 | 1457 | 4.8 | 2202 | 1.6 |
| 15 | 0324 | 3.1 | 0849 | 1.7 | 1546 | 5.2 | 2318 | .9 |
| 16 | 0516 | 3.0 | 0949 | 2.1 | 1639 | 5.7 | ---- | --- |
| 17 | 0020 | .1 | 0644 | 3.2 | 1055 | 2.3 | 1729 | 6.0 |
| 18 | 0113 | -.7 | 0744 | 3.5 | 1201 | 2.4 | 1824 | 6.5 |
| 19 | 0204 | -1.2 | 0833 | 3.6 | 1257 | 2.3 | 1913 | 6.8 |
| 20 | 0249 | -1.4 | 0918 | 3.9 | 1352 | 2.2 | 2003 | 6.9 |
| 21 | 0334 | -1.5 | 1000 | 4.0 | 1445 | 2.0 | 2051 | 6.8 |
| 22 | 0416 | -1.4 | 1039 | 4.2 | 1536 | 1.9 | 2137 | 6.5 |
| 23 | 0455 | -1.1 | 1121 | 4.3 | 1629 | 1.9 | 2225 | 6.0 |
| 24 | 0534 | -.6 | 1200 | 4.4 | 1725 | 1.9 | 2314 | 5.3 |
| 25 | 0613 | 0.0 | 1242 | 4.5 | 1827 | 2.0 | ---- | --- |
| 26 | 0003 | 4.5 | 0650 | .7 | 1327 | 4.6 | 1944 | 2.0 |
| 27 | 0105 | 3.7 | 0726 | 1.2 | 1412 | 4.6 | 2117 | 1.8 |
| 28 | 0233 | 3.2 | 0807 | 1.9 | 1505 | 4.7 | 2242 | 1.4 |
| 29 | 0439 | 2.9 | 0856 | 2.4 | 1558 | 4.8 | 2359 | 1.1 |
| 30 | 0630 | 3.0 | 1005 | 2.7 | 1651 | 5.0 | ---- | --- |
| 31 | 0047 | .6 | 0739 | 3.3 | 1114 | 2.9 | 1740 | 5.2 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 17**

SAN NICOLAS ISLAND TIDES
JULY 1986
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0027 | .8 | 0616 | 2.8 | 1108 | 1.8 | 1739 | 4.8 |
| 2 | 0115 | .4 | 0725 | 2.8 | 1150 | 2.1 | 1815 | 4.9 |
| 3 | 0155 | .1 | 0816 | 3.0 | 1232 | 2.2 | 1847 | 5.1 |
| 4 | 0230 | -.2 | 0858 | 3.0 | 1307 | 2.3 | 1922 | 5.2 |
| 5 | 0302 | -.4 | 0934 | 3.1 | 1343 | 2.4 | 1954 | 5.3 |
| 6 | 0336 | -.4 | 1008 | 3.2 | 1418 | 2.3 | 2026 | 5.4 |
| 7 | 0409 | -.5 | 1038 | 3.2 | 1454 | 2.3 | 2101 | 5.4 |
| 8 | 0440 | -.5 | 1114 | 3.3 | 1532 | 2.4 | 2136 | 5.3 |
| 9 | 0514 | -.4 | 1148 | 3.3 | 1612 | 2.4 | 2208 | 5.0 |
| 10 | 0546 | -.3 | 1223 | 3.4 | 1659 | 2.4 | 2247 | 4.8 |
| 11 | 0618 | 0.0 | 1258 | 3.5 | 1759 | 2.4 | 2333 | 4.3 |
| 12 | 0653 | .3 | 1337 | 3.8 | 1909 | 2.3 | ---- | --- |
| 13 | 0026 | 3.8 | 0728 | .7 | 1416 | 4.0 | 2039 | 1.9 |
| 14 | 0144 | 3.2 | 0811 | 1.1 | 1504 | 4.4 | 2212 | 1.5 |
| 15 | 0331 | 2.8 | 0859 | 1.6 | 1553 | 4.8 | 2328 | .8 |
| 16 | 0523 | 2.7 | 0959 | 1.9 | 1646 | 5.2 | ---- | --- |
| 17 | 0030 | .1 | 0651 | 2.9 | 1105 | 2.1 | 1736 | 5.5 |
| 18 | 0123 | -.6 | 0751 | 3.2 | 1211 | 2.2 | 1831 | 6.0 |
| 19 | 0214 | -1.1 | 0840 | 3.3 | 1307 | 2.1 | 1920 | 6.2 |
| 20 | 0259 | -1.3 | 0925 | 3.6 | 1402 | 2.0 | 2010 | 6.3 |
| 21 | 0344 | -1.4 | 1007 | 3.7 | 1455 | 1.8 | 2058 | 6.2 |
| 22 | 0426 | -1.3 | 1046 | 3.9 | 1546 | 1.8 | 2144 | 6.0 |
| 23 | 0505 | -1.0 | 1128 | 4.0 | 1639 | 1.8 | 2232 | 5.5 |
| 24 | 0544 | -.5 | 1207 | 4.0 | 1735 | 1.8 | 2321 | 4.8 |
| 25 | 0623 | 0.0 | 1249 | 4.1 | 1837 | 1.8 | ---- | --- |
| 26 | 0010 | 4.1 | 0700 | .6 | 1334 | 4.2 | 1954 | 1.8 |
| 27 | 0112 | 3.4 | 0736 | 1.1 | 1419 | 4.2 | 2127 | 1.7 |
| 28 | 0240 | 2.9 | 0817 | 1.8 | 1512 | 4.3 | 2252 | 1.3 |
| 29 | 0446 | 2.6 | 0906 | 2.2 | 1605 | 4.4 | 0009 | 1.0* |
| 30 | 0637 | 2.7 | 1015 | 2.5 | 1658 | 4.6 | ---- | --- |
| 31 | 0057 | .5 | 0746 | 3.0 | 1124 | 2.6 | 1747 | 4.8 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 18**

*POINT MUGU TIDES*
AUGUST 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0129 | .2 | 0817 | 3.5 | 1210 | 2.9 | 1822 | 5.4 |
| 2 | 0207 | -.1 | 0843 | 3.6 | 1255 | 2.7 | 1900 | 5.7 |
| 3 | 0236 | -.3 | 0905 | 3.6 | 1331 | 2.6 | 1938 | 5.9 |
| 4 | 0304 | -.4 | 0930 | 3.8 | 1406 | 2.4 | 2010 | 6.0 |
| 5 | 0331 | -.5 | 0955 | 3.9 | 1442 | 2.2 | 2043 | 6.0 |
| 6 | 0401 | -.5 | 1020 | 4.0 | 1520 | 2.1 | 2117 | 5.9 |
| 7 | 0426 | -.3 | 1045 | 4.2 | 1558 | 2.0 | 2153 | 5.6 |
| 8 | 0453 | 0.0 | 1113 | 4.4 | 1642 | 1.9 | 2231 | 5.1 |
| 9 | 0521 | .4 | 1142 | 4.5 | 1734 | 1.8 | 2315 | 4.5 |
| 10 | 0550 | .9 | 1219 | 4.7 | 1840 | 1.7 | ---- | --- |
| 11 | 0012 | 3.8 | 0622 | 1.3 | 1301 | 4.9 | 2004 | 1.5 |
| 12 | 0136 | 3.2 | 0658 | 1.9 | 1354 | 5.1 | 2140 | 1.2 |
| 13 | 0352 | 2.9 | 0750 | 2.4 | 1501 | 5.3 | 2309 | .6 |
| 14 | 0601 | 3.1 | 0923 | 2.8 | 1615 | 5.6 | ---- | --- |
| 15 | 0015 | -.1 | 0707 | 3.5 | 1100 | 2.8 | 1720 | 6.0 |
| 16 | 0107 | -.7 | 0747 | 3.7 | 1209 | 2.6 | 1822 | 6.3 |
| 17 | 0152 | -1.0 | 0821 | 4.0 | 1307 | 2.2 | 1913 | 6.6 |
| 18 | 0234 | -1.2 | 0852 | 4.3 | 1356 | 1.9 | 2000 | 6.7 |
| 19 | 0311 | -1.1 | 0927 | 4.5 | 1443 | 1.6 | 2042 | 6.5 |
| 20 | 0346 | -.9 | 0956 | 4.7 | 1529 | 1.4 | 2124 | 6.1 |
| 21 | 0418 | -.5 | 1028 | 4.9 | 1614 | 1.3 | 2206 | 5.6 |
| 22 | 0449 | .1 | 1102 | 4.9 | 1700 | 1.3 | 2249 | 4.9 |
| 23 | 0515 | .7 | 1134 | 4.9 | 1752 | 1.4 | 2338 | 4.2 |
| 24 | 0544 | 1.3 | 1206 | 4.8 | 1851 | 1.5 | ---- | --- |
| 25 | 0034 | 3.5 | 0610 | 1.9 | 1246 | 4.7 | 2014 | 1.6 |
| 26 | 0212 | 3.0 | 0627 | 2.5 | 1335 | 4.6 | 2157 | 1.4 |
| 27 | 1448 | 4.5 | 2330 | 1.2 | ---- | --- | ---- | --- |
| 28 | 1611 | 4.6 | ---- | --- | ---- | --- | ---- | --- |
| 29 | 0022 | .7 | 0737 | 3.6 | 1119 | 3.2 | 1713 | 4.9 |
| 30 | 0103 | .4 | 0752 | 3.7 | 1212 | 2.9 | 1802 | 5.2 |
| 31 | 0136 | .1 | 0810 | 3.8 | 1252 | 2.6 | 1844 | 5.6 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 19**

SAN NICOLAS ISLAND TIDES
AUGUST 1986
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0139 | .2 | 0824 | 3.2 | 1220 | 2.6 | 1829 | 4.9 |
| 2 | 0217 | -.1 | 0850 | 3.3 | 1305 | 2.5 | 1907 | 5.2 |
| 3 | 0246 | -.3 | 0912 | 3.3 | 1341 | 2.4 | 1945 | 5.4 |
| 4 | 0314 | -.4 | 0937 | 3.5 | 1416 | 2.2 | 2017 | 5.5 |
| 5 | 0341 | -.4 | 1002 | 3.6 | 1452 | 2.0 | 2050 | 5.5 |
| 6 | 0411 | -.4 | 1027 | 3.7 | 1530 | 1.9 | 2124 | 5.4 |
| 7 | 0436 | -.3 | 1052 | 3.9 | 1608 | 1.8 | 2200 | 5.1 |
| 8 | 0503 | 0.0 | 1120 | 4.0 | 1652 | 1.8 | 2238 | 4.7 |
| 9 | 0531 | .4 | 1149 | 4.1 | 1744 | 1.7 | 2322 | 4.1 |
| 10 | 0600 | .8 | 1226 | 4.3 | 1850 | 1.6 | ---- | --- |
| 11 | 0019 | 3.5 | 0632 | 1.2 | 1308 | 4.5 | 2014 | 1.4 |
| 12 | 0143 | 2.9 | 0708 | 1.8 | 1401 | 4.7 | 2150 | 1.1 |
| 13 | 0359 | 2.6 | 0800 | 2.2 | 1508 | 4.8 | 2319 | .5 |
| 14 | 0608 | 2.8 | 0933 | 2.6 | 1622 | 5.1 | ---- | --- |
| 15 | 0025 | -.1 | 0714 | 3.2 | 1110 | 2.6 | 1727 | 5.5 |
| 16 | 0117 | -.6 | 0754 | 3.4 | 1219 | 2.4 | 1829 | 5.8 |
| 17 | 0202 | -.9 | 0828 | 3.7 | 1317 | 2.0 | 1920 | 6.1 |
| 18 | 0244 | -1.1 | 0859 | 4.0 | 1406 | 1.8 | 2007 | 6.2 |
| 19 | 0321 | -1.0 | 0934 | 4.1 | 1453 | 1.5 | 2049 | 6.0 |
| 20 | 0356 | -.8 | 1003 | 4.3 | 1539 | 1.3 | 2131 | 5.6 |
| 21 | 0428 | -.4 | 1035 | 4.5 | 1624 | 1.2 | 2213 | 5.1 |
| 22 | 0459 | .1 | 1109 | 4.5 | 1710 | 1.2 | 2256 | 4.5 |
| 23 | 0525 | .6 | 1141 | 4.5 | 1802 | 1.3 | 2345 | 3.9 |
| 24 | 0554 | 1.2 | 1213 | 4.4 | 1901 | 1.4 | ---- | --- |
| 25 | 0041 | 3.2 | 0620 | 1.8 | 1253 | 4.3 | 2024 | 1.5 |
| 26 | 0219 | 2.7 | 0637 | 2.3 | 1342 | 4.2 | 2207 | 1.3 |
| 27 | 1455 | 4.1 | 2340 | 1.1 | ---- | --- | ---- | --- |
| 28 | 1618 | 4.2 | ---- | --- | ---- | --- | ---- | --- |
| 29 | 0032 | .6 | 0744 | 3.3 | 1129 | 2.9 | 1720 | 4.5 |
| 30 | 0113 | .4 | 0759 | 3.4 | 1222 | 2.6 | 1809 | 4.8 |
| 31 | 0146 | .1 | 0817 | 3.5 | 1302 | 2.4 | 1851 | 5.1 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 20**

POINT MUGU TIDES
SEPTEMBER 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0202 | -.1 | 0825 | 4.0 | 1323 | 2.3 | 1919 | 5.8 |
| 2 | 0230 | -.3 | 0844 | 4.2 | 1359 | 1.9 | 1953 | 5.9 |
| 3 | 0252 | -.3 | 0906 | 4.5 | 1432 | 1.6 | 2028 | 5.9 |
| 4 | 0318 | -.2 | 0927 | 4.7 | 1510 | 1.3 | 2105 | 5.7 |
| 5 | 0342 | .1 | 0951 | 5.0 | 1548 | 1.1 | 2142 | 5.3 |
| 6 | 0408 | .5 | 1016 | 5.2 | 1631 | 1.0 | 2226 | 4.8 |
| 7 | 0436 | 1.0 | 1046 | 5.3 | 1723 | .9 | 2313 | 4.1 |
| 8 | 0502 | 1.4 | 1123 | 5.4 | 1826 | .9 | ---- | --- |
| 9 | 0019 | 3.5 | 0531 | 2.0 | 1206 | 5.3 | 1948 | .9 |
| 10 | 0214 | 3.0 | 0606 | 2.6 | 1306 | 5.2 | 2131 | .7 |
| 11 | 1434 | 5.2 | 2301 | .3 | ---- | --- | ---- | --- |
| 12 | 0626 | 3.6 | 0951 | 3.2 | 1606 | 5.4 | 0002 | -.2* |
| 13 | 0655 | 3.9 | 1124 | 2.9 | 1719 | 5.7 | ---- | --- |
| 14 | 0052 | -.6 | 0726 | 4.2 | 1225 | 2.3 | 1818 | 6.0 |
| 15 | 0131 | -.7 | 0752 | 4.6 | 1314 | 1.8 | 1909 | 6.1 |
| 16 | 0207 | -.7 | 0820 | 4.9 | 1359 | 1.3 | 1952 | 6.0 |
| 17 | 0236 | -.4 | 0845 | 5.1 | 1438 | 1.0 | 2033 | 5.9 |
| 18 | 0307 | -.1 | 0913 | 5.3 | 1517 | .8 | 2112 | 5.5 |
| 19 | 0332 | .4 | 0938 | 5.4 | 1556 | .7 | 2152 | 4.9 |
| 20 | 0358 | .9 | 1004 | 5.4 | 1638 | .7 | 2233 | 4.4 |
| 21 | 0420 | 1.4 | 1028 | 5.3 | 1720 | .8 | 2318 | 3.7 |
| 22 | 0441 | 2.0 | 1054 | 5.1 | 1809 | 1.0 | ---- | --- |
| 23 | 0018 | 3.3 | 0453 | 2.5 | 1123 | 4.9 | 1918 | 1.2 |
| 24 | 0223 | 2.9 | 0435 | 2.8 | 1205 | 4.6 | 2101 | 1.2 |
| 25 | 1318 | 4.3 | 2240 | 1.1 | ---- | --- | ---- | --- |
| 26 | 1518 | 4.3 | 2340 | .8 | ---- | --- | ---- | --- |
| 27 | 0704 | 3.7 | 1119 | 3.3 | 1641 | 4.5 | ---- | --- |
| 28 | 0020 | .5 | 0710 | 3.9 | 1201 | 2.8 | 1735 | 4.8 |
| 29 | 0049 | .3 | 0723 | 4.2 | 1238 | 2.3 | 1817 | 5.1 |
| 30 | 0116 | .1 | 0736 | 4.5 | 1310 | 1.8 | 1857 | 5.4 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 21**

SAN NICOLAS ISLAND TIDES
SEPTEMBER 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0212 | -.1 | 0832 | 3.7 | 1333 | 2.1 | 1926 | 5.3 |
| 2 | 0240 | -.3 | 0851 | 3.9 | 1409 | 1.8 | 2000 | 5.4 |
| 3 | 0302 | -.3 | 0913 | 4.1 | 1442 | 1.5 | 2035 | 5.4 |
| 4 | 0328 | -.2 | 0934 | 4.3 | 1520 | 1.2 | 2112 | 5.2 |
| 5 | 0352 | .1 | 0958 | 4.6 | 1558 | 1.0 | 2149 | 4.8 |
| 6 | 0418 | .4 | 1023 | 4.8 | 1641 | .9 | 2233 | 4.4 |
| 7 | 0446 | .9 | 1053 | 4.8 | 1733 | .8 | 2320 | 3.8 |
| 8 | 0512 | 1.3 | 1130 | 4.9 | 1836 | .8 | ---- | --- |
| 9 | 0026 | 3.2 | 0541 | 1.8 | 1213 | 4.8 | 1958 | .8 |
| 10 | 0221 | 2.7 | 0616 | 2.4 | 1313 | 4.8 | 2141 | .6 |
| 11 | 1441 | 4.8 | 2311 | .3 | ---- | --- | ---- | --- |
| 12 | 0633 | 3.3 | 1001 | 2.9 | 1613 | 4.9 | 0012 | -.2* |
| 13 | 0702 | 3.6 | 1134 | 2.6 | 1726 | 5.2 | ---- | --- |
| 14 | 0102 | -.5 | 0733 | 3.9 | 1235 | 2.1 | 1825 | 5.5 |
| 15 | 0141 | -.6 | 0759 | 4.2 | 1324 | 1.7 | 1916 | 5.6 |
| 16 | 0217 | -.6 | 0827 | 4.5 | 1409 | 1.2 | 1959 | 5.5 |
| 17 | 0246 | -.4 | 0852 | 4.7 | 1448 | .9 | 2040 | 5.4 |
| 18 | 0317 | -.1 | 0920 | 4.8 | 1527 | .7 | 2119 | 5.0 |
| 19 | 0342 | .4 | 0945 | 4.9 | 1606 | .6 | 2159 | 4.5 |
| 20 | 0408 | .8 | 1011 | 4.9 | 1648 | .6 | 2240 | 4.0 |
| 21 | 0430 | 1.3 | 1035 | 4.8 | 1730 | .7 | 2325 | 3.4 |
| 22 | 0451 | 1.8 | 1101 | 4.7 | 1819 | .9 | ---- | --- |
| 23 | 0025 | 3.0 | 0503 | 2.3 | 1130 | 4.5 | 1928 | 1.1 |
| 24 | 0230 | 2.6 | 0445 | 2.6 | 1212 | 4.2 | 2111 | 1.1 |
| 25 | 1325 | 4.0 | 2250 | 1.0 | ---- | --- | ---- | --- |
| 26 | 1525 | 4.0 | 2350 | .7 | ---- | --- | ---- | --- |
| 27 | 0711 | 3.4 | 1129 | 3.0 | 1648 | 4.1 | ---- | --- |
| 28 | 0030 | .4 | 0717 | 3.6 | 1211 | 2.6 | 1742 | 4.4 |
| 29 | 0059 | .3 | 0730 | 3.9 | 1248 | 2.1 | 1824 | 4.7 |
| 30 | 0126 | .1 | 0743 | 4.1 | 1320 | 1.7 | 1904 | 4.9 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 22**

POINT MUGU TIDES
OCTOBER 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0141 | .1 | 0754 | 4.8 | 1342 | 1.3 | 1934 | 5.4 |
| 2 | 0206 | .2 | 0813 | 5.2 | 1420 | .9 | 2012 | 5.4 |
| 3 | 0232 | .4 | 0837 | 5.5 | 1455 | .4 | 2054 | 5.2 |
| 4 | 0257 | .7 | 0903 | 5.8 | 1537 | .1 | 2137 | 4.8 |
| 5 | 0326 | 1.1 | 0931 | 6.0 | 1622 | -.1 | 2226 | 4.3 |
| 6 | 0354 | 1.5 | 1003 | 6.0 | 1715 | -.1 | 2326 | 3.7 |
| 7 | 0422 | 2.1 | 1042 | 5.9 | 1819 | .1 | ---- | --- |
| 8 | 0051 | 3.3 | 0454 | 2.6 | 1131 | 5.6 | 1940 | .2 |
| 9 | 0321 | 3.2 | 0539 | 3.1 | 1242 | 5.3 | 2116 | .2 |
| 10 | 0512 | 3.6 | 0806 | 3.4 | 1421 | 5.0 | 2235 | 0.0 |
| 11 | 0553 | 3.9 | 1026 | 3.1 | 1600 | 5.0 | 2335 | -.2 |
| 12 | 0622 | 4.3 | 1137 | 2.5 | 1714 | 5.2 | ---- | --- |
| 13 | 0020 | -.3 | 0650 | 4.7 | 1230 | 1.8 | 1812 | 5.3 |
| 14 | 0057 | -.2 | 0716 | 5.1 | 1314 | 1.2 | 1859 | 5.3 |
| 15 | 0131 | .1 | 0741 | 5.4 | 1354 | .8 | 1943 | 5.2 |
| 16 | 0157 | .4 | 0806 | 5.6 | 1430 | .4 | 2025 | 4.9 |
| 17 | 0225 | .8 | 0828 | 5.8 | 1505 | .1 | 2103 | 4.6 |
| 18 | 0247 | 1.2 | 0850 | 5.8 | 1540 | .1 | 2143 | 4.2 |
| 19 | 0308 | 1.6 | 0915 | 5.7 | 1616 | .1 | 2225 | 3.8 |
| 20 | 0327 | 2.0 | 0937 | 5.6 | 1657 | .3 | 2315 | 3.5 |
| 21 | 0345 | 2.4 | 1002 | 5.3 | 1742 | .5 | ---- | --- |
| 22 | 0021 | 3.1 | 0353 | 2.8 | 1030 | 5.0 | 1842 | .8 |
| 23 | 1105 | 4.7 | 2003 | 1.0 | ---- | --- | ---- | --- |
| 24 | 1203 | 4.3 | 2130 | .9 | ---- | --- | ---- | --- |
| 25 | 0638 | 3.6 | 0846 | 3.6 | 1355 | 4.1 | 2234 | .8 |
| 26 | 0609 | 3.8 | 1052 | 3.3 | 1545 | 4.1 | 2316 | .6 |
| 27 | 0617 | 4.1 | 1138 | 2.7 | 1652 | 4.3 | 2353 | .5 |
| 28 | 0629 | 4.4 | 1215 | 2.0 | 1743 | 4.5 | ---- | --- |
| 29 | 0023 | .5 | 0644 | 4.9 | 1252 | 1.3 | 1830 | 4.6 |
| 30 | 0049 | .6 | 0702 | 5.3 | 1328 | .7 | 1916 | 4.7 |
| 31 | 0118 | .7 | 0727 | 5.8 | 1404 | 0.0 | 2002 | 4.6 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 23**

SAN NICOLAS ISLAND TIDES
OCTOBER 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0151 | .1 | 0801 | 4.4 | 1352 | 1.2 | 1941 | 4.9 |
| 2 | 0216 | .2 | 0820 | 4.8 | 1430 | .8 | 2019 | 4.9 |
| 3 | 0242 | .4 | 0844 | 5.0 | 1505 | .4 | 2101 | 4.8 |
| 4 | 0307 | .6 | 0910 | 5.3 | 1547 | .1 | 2144 | 4.4 |
| 5 | 0336 | 1.0 | 0938 | 5.5 | 1632 | -.1 | 2233 | 4.0 |
| 6 | 0404 | 1.4 | 1010 | 5.5 | 1725 | -.1 | 2333 | 3.4 |
| 7 | 0432 | 1.9 | 1049 | 5.4 | 1829 | .1 | ---- | --- |
| 8 | 0058 | 3.0 | 0504 | 2.4 | 1138 | 5 1 | 1950 | .2 |
| 9 | 0328 | 2.9 | 0549 | 2.8 | 1249 | 4.8 | 2126 | .2 |
| 10 | 0519 | 3.3 | 0816 | 3.1 | 1428 | 4.6 | 2245 | 0.0 |
| 11 | 0600 | 3.6 | 1036 | 2.8 | 1607 | 4.6 | 2345 | -.2 |
| 12 | 0629 | 4.0 | 1147 | 2.3 | 1721 | 4.8 | ---- | --- |
| 13 | 0030 | -.3 | 0657 | 4.3 | 1240 | 1.7 | 1819 | 4.8 |
| 14 | 0107 | -.2 | 0723 | 4.7 | 1324 | 1.1 | 1906 | 4.8 |
| 15 | 0141 | .1 | 0748 | 4.9 | 1404 | .7 | 1950 | 4.8 |
| 16 | 0207 | .4 | 0813 | 5.1 | 1440 | .4 | 2032 | 4.5 |
| 17 | 0235 | .7 | 0835 | 5.3 | 1515 | .1 | 2110 | 4.2 |
| 18 | 0257 | 1.1 | 0857 | 5.3 | 1550 | .1 | 2150 | 3.9 |
| 19 | 0318 | 1.5 | 0922 | 5.2 | 1626 | .1 | 2232 | 3.5 |
| 20 | 0337 | 1.8 | 0944 | 5.1 | 1707 | .3 | 2322 | 3.2 |
| 21 | 0355 | 2.2 | 1009 | 4.8 | 1752 | .4 | ---- | --- |
| 22 | 0028 | 2.8 | 0403 | 2.6 | 1037 | 4.6 | 1852 | .7 |
| 23 | 1112 | 4.3 | 2013 | .9 | ---- | --- | ---- | --- |
| 24 | 1210 | 4.0 | 2140 | .8 | ---- | --- | ---- | --- |
| 25 | 0645 | 3.3 | 0856 | 3.3 | 1402 | 3.8 | 2244 | .7 |
| 26 | 0616 | 3.5 | 1102 | 3.0 | 1552 | 3.8 | 2326 | .5 |
| 27 | 0624 | 3.8 | 1148 | 2.5 | 1659 | 4.0 | 0003 | .4* |
| 28 | 0636 | 4.0 | 1225 | 1.8 | 1750 | 4.1 | ---- | --- |
| 29 | 0033 | .4 | 0651 | 4.5 | 1302 | 1.2 | 1837 | 4.2 |
| 30 | 0059 | .5 | 0709 | 4.8 | 1338 | .6 | 1923 | 4.3 |
| 31 | 0128 | .6 | 0734 | 5.3 | 1414 | 0.0 | 2009 | 4.2 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 24**

POINT MUGU TIDES
NOVEMBER 1986
34 DEG 06 MIN N, 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0146 | 1.0 | 0752 | 6.1 | 1446 | -.5 | 2049 | 4.5 |
| 2 | 0217 | 1.2 | 0824 | 6.4 | 1528 | -.9 | 2139 | 4.2 |
| 3 | 0249 | 1.6 | 0859 | 6.5 | 1617 | -1.0 | 2238 | 3.8 |
| 4 | 0325 | 2.0 | 0936 | 6.4 | 1713 | -.9 | 2347 | 3.6 |
| 5 | 0401 | 2.5 | 1022 | 6.2 | 1814 | -.7 | ---- | --- |
| 6 | 0117 | 3.4 | 0453 | 2.9 | 1118 | 5.8 | 1928 | -.4 |
| 7 | 0300 | 3.5 | 0611 | 3.2 | 1231 | 5.2 | 2047 | -.2 |
| 8 | 0418 | 3.8 | 0834 | 3.2 | 1406 | 4.8 | 2154 | -.1 |
| 9 | 0504 | 4.2 | 1023 | 2.7 | 1542 | 4.6 | 2253 | .1 |
| 10 | 0540 | 4.7 | 1133 | 2.0 | 1658 | 4.5 | 2338 | .3 |
| 11 | 0612 | 5.1 | 1225 | 1.3 | 1801 | 4.4 | ---- | --- |
| 12 | 0017 | .6 | 0637 | 5.4 | 1310 | .8 | 1855 | 4.3 |
| 13 | 0049 | .9 | 0702 | 5.7 | 1349 | .3 | 1942 | 4.2 |
| 14 | 0118 | 1.2 | 0727 | 5.9 | 1424 | -.1 | 2025 | 4.0 |
| 15 | 0142 | 1.5 | 0750 | 6.0 | 1456 | -.3 | 2106 | 3.8 |
| 16 | 0207 | 1.9 | 0815 | 6.0 | 1532 | -.4 | 2146 | 3.6 |
| 17 | 0232 | 2.1 | 0840 | 5.9 | 1604 | -.3 | 2231 | 3.5 |
| 18 | 0251 | 2.4 | 0906 | 5.7 | 1644 | -.2 | 2321 | 3.3 |
| 19 | 0314 | 2.6 | 0934 | 5.5 | 1728 | 0.0 | ---- | --- |
| 20 | 0024 | 3.1 | 0332 | 2.9 | 1006 | 5.2 | 1816 | .3 |
| 21 | 1044 | 4.9 | 1914 | .5 | ---- | --- | ---- | --- |
| 22 | 1133 | 4.5 | 2014 | .6 | ---- | --- | ---- | --- |
| 23 | 0441 | 3.6 | 0730 | 3.5 | 1243 | 4.1 | 2111 | .7 |
| 24 | 0452 | 3.8 | 0950 | 3.2 | 1425 | 3.8 | 2200 | .8 |
| 25 | 0507 | 4.2 | 1100 | 2.5 | 1559 | 3.7 | 2239 | .9 |
| 26 | 0527 | 4.6 | 1153 | 1.7 | 1708 | 3.7 | 2317 | 1.0 |
| 27 | 0551 | 5.1 | 1231 | 1.0 | 1809 | 3.8 | 2353 | 1.2 |
| 28 | 0614 | 5.7 | 1313 | .2 | 1907 | 3.9 | ---- | --- |
| 29 | 0031 | 1.3 | 0646 | 6.1 | 1355 | -.6 | 2000 | 3.9 |
| 30 | 0107 | 1.6 | 0721 | 6.5 | 1438 | -1.2 | 2052 | 3.9 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 25**

SAN NICOLAS ISLAND TIDES
NOVEMBER 1986
33 DEG 16 MIN N, 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0156 | .9 | 0759 | 5.6 | 1456 | -.4 | 2056 | 4.1 |
| 2 | 0227 | 1.1 | 0831 | 5.9 | 1538 | -.8 | 2146 | 3.9 |
| 3 | 0259 | 1.5 | 0906 | 6.0 | 1627 | -.9 | 2245 | 3.5 |
| 4 | 0335 | 1.8 | 0943 | 5.9 | 1723 | -.8 | 2354 | 3.3 |
| 5 | 0411 | 2.3 | 1029 | 5.7 | 1824 | -.6 | ---- | --- |
| 6 | 0124 | 3.1 | 0503 | 2.6 | 1125 | 5.3 | 1938 | -.4 |
| 7 | 0307 | 3.2 | 0621 | 2.9 | 1238 | 4.8 | 2057 | -.2 |
| 8 | 0425 | 3.5 | 0844 | 2.9 | 1413 | 4.4 | 2204 | -.1 |
| 9 | 0511 | 3.9 | 1033 | 2.5 | 1549 | 4.2 | 2303 | .1 |
| 10 | 0547 | 4.3 | 1143 | 1.8 | 1705 | 4.1 | 2348 | .3 |
| 11 | 0619 | 4.7 | 1235 | 1.2 | 1808 | 4.0 | ---- | --- |
| 12 | 0027 | .5 | 0644 | 4.9 | 1320 | .7 | 1902 | 4.0 |
| 13 | 0059 | .8 | 0709 | 5.2 | 1359 | .3 | 1949 | 3.9 |
| 14 | 0128 | 1.1 | 0734 | 5.4 | 1434 | -.1 | 2032 | 3.7 |
| 15 | 0152 | 1.4 | 0757 | 5.5 | 1506 | -.3 | 2113 | 3.5 |
| 16 | 0217 | 1.8 | 0822 | 5.5 | 1542 | -.4 | 2153 | 3.3 |
| 17 | 0242 | 1.9 | 0847 | 5.4 | 1614 | -.3 | 2238 | 3.2 |
| 18 | 0301 | 2.2 | 0913 | 5.2 | 1654 | -.2 | 2328 | 3.0 |
| 19 | 0324 | 2.4 | 0941 | 5.0 | 1738 | 0.0 | ---- | --- |
| 20 | 0031 | 2.8 | 0342 | 2.6 | 1013 | 4.8 | 1826 | .3 |
| 21 | 1051 | 4.5 | 1924 | .4 | ---- | --- | ---- | --- |
| 22 | 1140 | 4.1 | 2024 | .5 | ---- | --- | ---- | --- |
| 23 | 0448 | 3.3 | 0740 | 3.2 | 1250 | 3.8 | 2121 | .6 |
| 24 | 0459 | 3.5 | 1000 | 2.9 | 1432 | 3.5 | 2210 | .7 |
| 25 | 0514 | 3.9 | 1110 | 2.3 | 1606 | 3.4 | 2249 | .8 |
| 26 | 0534 | 4.2 | 1203 | 1.6 | 1715 | 3.4 | 2327 | .9 |
| 27 | 0558 | 4.7 | 1241 | .9 | 1816 | 3.5 | 0003 | 1.1* |
| 28 | 0621 | 5.2 | 1323 | .2 | 1914 | 3.6 | ---- | --- |
| 29 | 0041 | 1.2 | 0653 | 5.6 | 1405 | -.5 | 2007 | 3.6 |
| 30 | 0117 | 1.5 | 0728 | 6.0 | 1448 | -1.1 | 2059 | 3.6 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 26**

POINT MUGU TIDES
DECEMBER 1986
34 DEG 06 MIN N. 119 DEG 06 MIN W - OCEAN PIER

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0145 | 1.8 | 0800 | 6.8 | 1526 | -1.4 | 2151 | 3.8 |
| 2 | 0227 | 2.0 | 0842 | 6.9 | 1614 | -1.5 | 2246 | 3.7 |
| 3 | 0313 | 2.2 | 0927 | 6.7 | 1707 | -1.4 | 2348 | 3.6 |
| 4 | 0403 | 2.5 | 1016 | 6.4 | 1803 | -1.2 | ---- | --- |
| 5 | 0055 | 3.6 | 0507 | 2.7 | 1113 | 5.9 | 1903 | -.8 |
| 6 | 0207 | 3.7 | 0632 | 2.9 | 1219 | 5.2 | 2005 | -.3 |
| 7 | 0313 | 4.1 | 0817 | 2.8 | 1340 | 4.5 | 2106 | .1 |
| 8 | 0405 | 4.4 | 1002 | 2.3 | 1509 | 3.9 | 2158 | .5 |
| 9 | 0447 | 4.8 | 1116 | 1.6 | 1639 | 3.6 | 2245 | 1.0 |
| 10 | 0525 | 5.2 | 1216 | 1.0 | 1753 | 3.6 | 2331 | 1.3 |
| 11 | 0559 | 5.5 | 1302 | .5 | 1859 | 3.5 | 0009 | 1.6* |
| 12 | 0628 | 5.7 | 1344 | 0.0 | 1951 | 3.5 | ---- | --- |
| 13 | 0041 | 1.9 | 0658 | 5.8 | 1419 | -.3 | 2034 | 3.5 |
| 14 | 0113 | 2.2 | 0723 | 5.9 | 1454 | -.5 | 2118 | 3.5 |
| 15 | 0142 | 2.3 | 0753 | 5.9 | 1526 | -.6 | 2156 | 3.5 |
| 16 | 0210 | 2.4 | 0823 | 5.9 | 1558 | -.6 | 2236 | 3.4 |
| 17 | 0242 | 2.5 | 0853 | 5.8 | 1633 | -.5 | 2314 | 3.4 |
| 18 | 0314 | 2.6 | 0925 | 5.6 | 1711 | -.4 | 2357 | 3.3 |
| 19 | 0346 | 2.7 | 0957 | 5.4 | 1747 | -.2 | ---- | --- |
| 20 | 0046 | 3.4 | 0428 | 2.9 | 1032 | 5.1 | 1827 | .1 |
| 21 | 0135 | 3.5 | 0525 | 3.0 | 1114 | 4.6 | 1906 | .3 |
| 22 | 0224 | 3.6 | 0648 | 3.0 | 1205 | 4.1 | 1948 | .6 |
| 23 | 0306 | 3.8 | 0834 | 2.8 | 1322 | 3.6 | 2033 | 1.0 |
| 24 | 0341 | 4.2 | 1011 | 2.2 | 1505 | 3.2 | 2122 | 1.2 |
| 25 | 0418 | 4.7 | 1119 | 1.4 | 1645 | 3.1 | 2211 | 1.5 |
| 26 | 0455 | 5.2 | 1212 | .6 | 1809 | 3.2 | 2300 | 1.8 |
| 27 | 0535 | 5.8 | 1303 | -.3 | 1916 | 3.4 | 2353 | 2.0 |
| 28 | 0617 | 6.2 | 1347 | -1.0 | 2011 | 3.6 | ---- | --- |
| 29 | 0041 | 2.0 | 0701 | 6.6 | 1435 | -1.4 | 2103 | 3.6 |
| 30 | 0131 | 2.1 | 0747 | 6.9 | 1521 | -1.8 | 2149 | 3.7 |
| 31 | 0222 | 2.0 | 0833 | 7.0 | 1606 | -1.8 | 2237 | 3.8 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

**TABLE 27**

SAN NICOLAS ISLAND TIDES
DECEMBER 1986
33 DEG 16 MIN N. 119 DEG 30 MIN W - CENTRAL PART NE COAST

| DATE | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT | TIME PST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0155 | 1.7 | 0807 | 6.2 | 1536 | -1.3 | 2158 | 3.5 |
| 2 | 0237 | 1.8 | 0849 | 6.3 | 1624 | -1.4 | 2253 | 3.4 |
| 3 | 0323 | 2.0 | 0934 | 6.2 | 1717 | -1.3 | 2355 | 3.3 |
| 4 | 0413 | 2.3 | 1023 | 5.9 | 1813 | -1.1 | ---- | --- |
| 5 | 0102 | 3.3 | 0517 | 2.5 | 1120 | 5.4 | 1913 | -.7 |
| 6 | 0214 | 3.4 | 0642 | 2.6 | 1226 | 4.8 | 2015 | -.3 |
| 7 | 0320 | 3.8 | 0827 | 2.6 | 1347 | 4.1 | 2116 | .1 |
| 8 | 0412 | 4.0 | 1012 | 2.1 | 1516 | 3.6 | 2208 | .4 |
| 9 | 0454 | 4.4 | 1126 | 1.5 | 1646 | 3.3 | 2255 | .9 |
| 10 | 0532 | 4.8 | 1226 | .9 | 1800 | 3.3 | 2341 | 1.2 |
| 11 | 0606 | 5.0 | 1312 | .4 | 1906 | 3.2 | 0019 | 1.5* |
| 12 | 0635 | 5.2 | 1354 | 0.0 | 1958 | 3.2 | ---- | --- |
| 13 | 0051 | 1.8 | 0705 | 5.3 | 1429 | -.3 | 2041 | 3.2 |
| 14 | 0123 | 2.0 | 0730 | 5.4 | 1504 | -.4 | 2125 | 3.2 |
| 15 | 0152 | 2.1 | 0800 | 5.4 | 1536 | -.5 | 2203 | 3.2 |
| 16 | 0220 | 2.2 | 0830 | 5.4 | 1608 | -.5 | 2243 | 3.1 |
| 17 | 0252 | 2.3 | 0900 | 5.3 | 1643 | -.4 | 2321 | 3.1 |
| 18 | 0324 | 2.4 | 0932 | 5.1 | 1721 | -.4 | 0004 | 3.0* |
| 19 | 0356 | 2.5 | 1004 | 4.9 | 1757 | -.2 | ---- | --- |
| 20 | 0053 | 3.1 | 0438 | 2.6 | 1039 | 4.7 | 1837 | .1 |
| 21 | 0142 | 3.2 | 0535 | 2.7 | 1121 | 4.2 | 1916 | .3 |
| 22 | 0231 | 3.3 | 0658 | 2.7 | 1212 | 3.8 | 1958 | .5 |
| 23 | 0313 | 3.5 | 0844 | 2.6 | 1329 | 3.3 | 2043 | .9 |
| 24 | 0348 | 3.9 | 1021 | 2.0 | 1512 | 2.9 | 2132 | 1.1 |
| 25 | 0425 | 4.3 | 1129 | 1.3 | 1652 | 2.8 | 2221 | 1.4 |
| 26 | 0502 | 4.8 | 1222 | .5 | 1816 | 2.9 | 2310 | 1.7 |
| 27 | 0542 | 5.3 | 1313 | -.3 | 1923 | 3.1 | 0003 | 1.8* |
| 28 | 0624 | 5.7 | 1357 | -.9 | 2018 | 3.3 | ---- | --- |
| 29 | 0051 | 1.8 | 0708 | 6.1 | 1445 | -1.3 | 2110 | 3.3 |
| 30 | 0141 | 1.9 | 0754 | 6.3 | 1531 | -1.7 | 2156 | 3.4 |
| 31 | 0232 | 1.8 | 0840 | 6.4 | 1616 | -1.7 | 2244 | 3.5 |

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

Table 28. Moonrise and Moonset, Barking Sands, Hawaii, 1986.
Hawaii-Aleutian Standard Time

| Date | January | | February | | March | | April | | May | | June | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | |
| 1 | 2325 | 1125 | 0015 | 1152 | | 1034 | 0123 | 1209 | 0156 | 1310 | 0219 | 1442 | 1 |
| 2 | | 1200 | 0117 | 1235 | 0015 | 1121 | 0221 | 1313 | 0237 | 1408 | 0250 | 1533 | 2 |
| 3 | 0022 | 1236 | 0221 | 1324 | 0121 | 1214 | 0312 | 1415 | 0312 | 1502 | 0321 | 1623 | 3 |
| 4 | 0120 | 1313 | 0328 | 1419 | 0226 | 1312 | 0356 | 1515 | 0345 | 1554 | 0354 | 1715 | 4 |
| 5 | 0221 | 1354 | 0434 | 1521 | 0328 | 1415 | 0435 | 1612 | 0416 | 1645 | 0430 | 1808 | 5 |
| 6 | 0326 | 1440 | 0535 | 1626 | 0424 | 1519 | 0510 | 1706 | 0447 | 1736 | 0509 | 1902 | 6 |
| 7 | 0433 | 1533 | 0631 | 1732 | 0514 | 1622 | 0543 | 1758 | 0519 | 1827 | 0553 | 1956 | 7 |
| 8 | 0542 | 1633 | 0719 | 1835 | 0557 | 1722 | 0614 | 1849 | 0553 | 1920 | 0641 | 2049 | 8 |
| 9 | 0649 | 1738 | 0801 | 1934 | 0635 | 1819 | 0645 | 1941 | 0630 | 2013 | 0733 | 2138 | 9 |
| 10 | 0750 | 1845 | 0838 | 2031 | 0710 | 1913 | 0718 | 2033 | 0710 | 2108 | 0828 | 2224 | 10 |
| 11 | 0843 | 1951 | 0912 | 2124 | 0742 | 2005 | 0753 | 2126 | 0756 | 2201 | 0924 | 2306 | 11 |
| 12 | 0929 | 2052 | 0944 | 2216 | 0814 | 2057 | 0831 | 2220 | 0845 | 2253 | 1019 | 2344 | 12 |
| 13 | 1008 | 2150 | 1016 | 2307 | 0846 | 2149 | 0913 | 2314 | 0938 | 2341 | 1115 | | 13 |
| 14 | 1043 | 2244 | 1048 | 2358 | 0919 | 2241 | 1000 | | 1033 | | 1210 | 0019 | 14 |
| 15 | 1116 | 2335 | 1122 | | 0955 | 2334 | 1051 | 0007 | 1129 | 0026 | 1305 | 0054 | 15 |
| 16 | 1147 | | 1159 | 0050 | 1035 | | 1145 | 0058 | 1226 | 0107 | 1402 | 0128 | 16 |
| 17 | 1218 | 0026 | 1241 | 0144 | 1119 | 0028 | 1242 | 0146 | 1322 | 0145 | 1502 | 0204 | 17 |
| 18 | 1250 | 0116 | 1327 | 0238 | 1207 | 0122 | 1339 | 0230 | 1419 | 0220 | 1606 | 0243 | 18 |
| 19 | 1326 | 0207 | 1418 | 0333 | 1300 | 0215 | 1437 | 0310 | 1517 | 0256 | 1714 | 0327 | 19 |
| 20 | 1404 | 0300 | 1513 | 0425 | 1357 | 0306 | 1536 | 0349 | 1617 | 0331 | 1826 | 0418 | 20 |
| 21 | 1448 | 0354 | 1612 | 0515 | 1455 | 0353 | 1634 | 0425 | 1721 | 0410 | 1936 | 0518 | 21 |
| 22 | 1536 | 0449 | 1711 | 0602 | 1555 | 0437 | 1735 | 0501 | 1829 | 0452 | 2042 | 0624 | 22 |
| 23 | 1629 | 0543 | 1811 | 0644 | 1654 | 0517 | 1838 | 0539 | 1940 | 0541 | 2139 | 0734 | 23 |
| 24 | 1726 | 0635 | 1910 | 0723 | 1753 | 0555 | 1944 | 0620 | 2051 | 0637 | 2228 | 0843 | 24 |
| 25 | 1825 | 0723 | 2009 | 0800 | 1853 | 0632 | 2053 | 0705 | 2159 | 0740 | 2310 | 0947 | 25 |
| 26 | 1924 | 0808 | 2108 | 0836 | 1955 | 0709 | 2204 | 0757 | 2300 | 0847 | 2346 | 1047 | 26 |
| 27 | 2023 | 0848 | 2208 | 0913 | 2058 | 0747 | 2312 | 0855 | 2351 | 0955 | | 1143 | 27 |
| 28 | 2120 | 0926 | 2310 | 0951 | 2204 | 0829 | | 0958 | | 1100 | 0020 | 1236 | 28 |
| 29 | 2218 | 1002 | | | 2312 | 0916 | 0015 | 1104 | 0035 | 1201 | 0051 | 1328 | 29 |
| 30 | 2315 | 1037 | | | | 1008 | 0109 | 1209 | 0113 | 1257 | 0123 | 1419 | 30 |
| 31 | | 1113 | | | 0019 | 1106 | | | 0147 | 1351 | | | 31 |

| Date | July | | August | | September | | October | | November | | December | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set | |
| 1 | 0155 | 1511 | 0232 | 1639 | 0358 | 1741 | 0436 | 1728 | 0613 | 1748 | 0712 | 1806 | 1 |
| 2 | 0230 | 1604 | 0322 | 1730 | 0456 | 1820 | 0532 | 1802 | 0718 | 1834 | 0824 | 1911 | 2 |
| 3 | 0308 | 1657 | 0416 | 1819 | 0552 | 1856 | 0629 | 1838 | 0827 | 1926 | 0932 | 2020 | 3 |
| 4 | 0351 | 1751 | 0512 | 1904 | 0648 | 1931 | 0729 | 1915 | 0937 | 2025 | 1032 | 2130 | 4 |
| 5 | 0437 | 1845 | 0609 | 1944 | 0744 | 2005 | 0831 | 1956 | 1045 | 2130 | 1123 | 2236 | 5 |
| 6 | 0529 | 1935 | 0705 | 2022 | 0841 | 2040 | 0936 | 2043 | 1147 | 2237 | 1207 | 2338 | 6 |
| 7 | 0623 | 2022 | 0801 | 2057 | 0940 | 2118 | 1043 | 2136 | 1241 | 2343 | 1245 | | 7 |
| 8 | 0719 | 2105 | 0856 | 2130 | 1041 | 2200 | 1151 | 2236 | 1328 | | 1319 | 0036 | 8 |
| 9 | 0815 | 2145 | 0951 | 2204 | 1145 | 2247 | 1255 | 2340 | 1408 | 0046 | 1351 | 0130 | 9 |
| 10 | 0910 | 2221 | 1047 | 2239 | 1252 | 2342 | 1353 | | 1444 | 0145 | 1423 | 0223 | 10 |
| 11 | 1005 | 2255 | 1145 | 2318 | 1357 | | 1444 | 0046 | 1517 | 0241 | 1456 | 0316 | 11 |
| 12 | 1100 | 2328 | 1247 | | 1500 | 0042 | 1528 | 0150 | 1549 | 0334 | 1531 | 0408 | 12 |
| 13 | 1155 | | 1352 | 0001 | 1556 | 0147 | 1607 | 0251 | 1621 | 0427 | 1609 | 0502 | 13 |
| 14 | 1252 | 0002 | 1459 | 0051 | 1646 | 0254 | 1642 | 0350 | 1655 | 0520 | 1651 | 0557 | 14 |
| 15 | 1352 | 0039 | 1606 | 0148 | 1729 | 0358 | 1715 | 0445 | 1731 | 0613 | 1737 | 0651 | 15 |
| 16 | 1456 | 0119 | 1708 | 0252 | 1808 | 0500 | 1748 | 0539 | 1810 | 0708 | 1828 | 0745 | 16 |
| 17 | 1604 | 0206 | 1804 | 0400 | 1843 | 0559 | 1821 | 0633 | 1854 | 0803 | 1921 | 0836 | 17 |
| 18 | 1714 | 0300 | 1852 | 0508 | 1916 | 0655 | 1855 | 0726 | 1941 | 0857 | 2015 | 0923 | 18 |
| 19 | 1821 | 0402 | 1934 | 0613 | 1949 | 0749 | 1933 | 0821 | 2033 | 0950 | 2110 | 1005 | 19 |
| 20 | 1923 | 0510 | 2012 | 0714 | 2022 | 0843 | 2014 | 0916 | 2126 | 1040 | 2203 | 1044 | 20 |
| 21 | 2016 | 0620 | 2046 | 0812 | 2058 | 0937 | 2059 | 1011 | 2221 | 1125 | 2256 | 1119 | 21 |
| 22 | 2102 | 0728 | 2119 | 0907 | 2137 | 1031 | 2148 | 1105 | 2316 | 1207 | 2349 | 1152 | 22 |
| 23 | 2141 | 0831 | 2152 | 1001 | 2219 | 1126 | 2240 | 1157 | | 1244 | | 1224 | 23 |
| 24 | 2217 | 0930 | 2226 | 1054 | 2306 | 1221 | 2335 | 1245 | 0010 | 1320 | 0042 | 1257 | 24 |
| 25 | 2250 | 1026 | 2302 | 1148 | 2356 | 1314 | | 1330 | 0103 | 1353 | 0137 | 1332 | 25 |
| 26 | 2322 | 1120 | 2342 | 1242 | | 1405 | 0030 | 1410 | 0158 | 1426 | 0235 | 1410 | 26 |
| 27 | 2354 | 1212 | | 1336 | 0050 | 1452 | 0126 | 1448 | 0253 | 1501 | 0338 | 1454 | 27 |
| 28 | | 1304 | 0026 | 1430 | 0146 | 1536 | 0221 | 1523 | 0352 | 1538 | 0445 | 1546 | 28 |
| 29 | 0029 | 1357 | 0114 | 1523 | 0243 | 1616 | 0316 | 1557 | 0454 | 1620 | 0556 | 1646 | 29 |
| 30 | 0106 | 1451 | 0206 | 1613 | 0339 | 1653 | 0413 | 1632 | 0602 | 1709 | 0707 | 1754 | 30 |
| 31 | 0147 | 1545 | 0302 | 1659 | | | 0511 | 1708 | | | 0812 | 1906 | 31 |

**TABLE 29**

PORT ALLEN TIDES
JANUARY 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 2351 | .3* | 0654 | 1.6 | 1437 | .1 | 2027 | .8 |
| 2 | 0104 | .5 | 0736 | 1.4 | 1512 | 0.0 | 2148 | .9 |
| 3 | 0252 | .6 | 0821 | 1.2 | 1551 | -.1 | 2257 | 1.2 |
| 4 | 0505 | .7 | 0920 | .9 | 1630 | -.1 | ---- | --- |
| 5 | 2356 | 1.5* | 0701 | .5 | 1029 | .7 | 1714 | -.2 |
| 6 | 0048 | 1.8 | 0822 | .3 | 1145 | .6 | 1759 | -.2 |
| 7 | 0133 | 2.0 | 0921 | .3 | 1254 | .4 | 1844 | -.3 |
| 8 | 0219 | 2.1 | 1010 | .1 | 1357 | .4 | 1932 | -.3 |
| 9 | 0304 | 2.2 | 1052 | .1 | 1451 | .4 | 2021 | -.3 |
| 10 | 0346 | 2.2 | 1130 | 0.0 | 1540 | .4 | 2103 | -.2 |
| 11 | 0426 | 2.1 | 1209 | 0.0 | 1630 | .5 | 2149 | -.1 |
| 12 | 0505 | 2.0 | 1244 | 0.0 | 1721 | .5 | 2234 | 0.0 |
| 13 | 0543 | 1.9 | 1318 | .1 | 1816 | .6 | 2319 | .2 |
| 14 | 0615 | 1.6 | 1350 | .1 | 1919 | .7 | ---- | --- |
| 15 | 0015 | .3 | 0647 | 1.4 | 1419 | .1 | 2032 | .9 |
| 16 | 0124 | .6 | 0722 | 1.2 | 1451 | .1 | 2147 | 1.0 |
| 17 | 0312 | .7 | 0752 | .9 | 1526 | .1 | 2257 | 1.2 |
| 18 | 0540 | .7 | 0834 | .8 | 1601 | .1 | ---- | --- |
| 19 | 2351 | 1.4* | 0750 | .5 | 0945 | .6 | 1645 | 0.0 |
| 20 | 0038 | 1.5 | 0842 | .4 | 1118 | .5 | 1730 | 0.0 |
| 21 | 0118 | 1.6 | 0920 | .3 | 1229 | .4 | 1816 | 0.0 |
| 22 | 0156 | 1.8 | 0949 | .3 | 1326 | .4 | 1858 | -.1 |
| 23 | 0231 | 1.9 | 1018 | .2 | 1407 | .4 | 1937 | -.1 |
| 24 | 0304 | 2.0 | 1044 | .2 | 1449 | .5 | 2019 | -.2 |
| 25 | 0335 | 2.0 | 1111 | .1 | 1525 | .5 | 2054 | -.1 |
| 26 | 0407 | 2.0 | 1137 | .1 | 1607 | .6 | 2136 | -.1 |
| 27 | 0439 | 1.9 | 1202 | .1 | 1649 | .7 | 2219 | 0.0 |
| 28 | 0511 | 1.8 | 1227 | 0.0 | 1740 | .8 | 2307 | .2 |
| 29 | 0539 | 1.6 | 1255 | 0.0 | 1837 | .9 | ---- | --- |
| 30 | 0004 | .3 | 0615 | 1.4 | 1325 | 0.0 | 1946 | 1.0 |
| 31 | 0121 | .5 | 0647 | 1.1 | 1400 | -.1 | 2102 | 1.2 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 30**

PORT ALLEN TIDES
FEBRUARY 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0314 | .6 | 0729 | .9 | 1442 | -.1 | 2221 | 1.4 |
| 2 | 0550 | .5 | 0821 | .6 | 1532 | -.1 | ---- | --- |
| 3 | 2330 | 1.6* | 0745 | .3 | 1000 | .4 | 1633 | -.1 |
| 4 | 0028 | 1.8 | 0840 | .3 | 1154 | .3 | 1732 | -.1 |
| 5 | 0121 | 2.0 | 0919 | .1 | 1310 | .4 | 1835 | -.2 |
| 6 | 0208 | 2.0 | 0951 | .1 | 1407 | .4 | 1930 | -.2 |
| 7 | 0250 | 2.0 | 1023 | 0.0 | 1453 | .5 | 2019 | -.2 |
| 8 | 0329 | 2.0 | 1051 | 0.0 | 1534 | .6 | 2105 | -.2 |
| 9 | 0404 | 2.0 | 1119 | 0.0 | 1614 | .7 | 2150 | -.1 |
| 10 | 0437 | 1.8 | 1145 | 0.0 | 1656 | .9 | 2232 | .1 |
| 11 | 0505 | 1.6 | 1209 | 0.0 | 1741 | .9 | 2319 | .3 |
| 12 | 0534 | 1.4 | 1233 | 0.0 | 1830 | 1.0 | ---- | --- |
| 13 | 0013 | .3 | 0558 | 1.2 | 1257 | .1 | 1925 | 1.0 |
| 14 | 0119 | .5 | 0623 | .9 | 1323 | .1 | 2028 | 1.1 |
| 15 | 0257 | .6 | 0642 | .8 | 1356 | .1 | 2144 | 1.2 |
| 16 | 1441 | .1 | 2258 | 1.4 | ---- | --- | ---- | --- |
| 17 | 1540 | .1 | ---- | --- | ---- | --- | ---- | --- |
| 18 | 2357 | 1.4* | 0833 | .3 | 1113 | .4 | 1648 | .1 |
| 19 | 0045 | 1.6 | 0852 | .3 | 1230 | .4 | 1747 | .1 |
| 20 | 0126 | 1.7 | 0914 | .2 | 1318 | .5 | 1843 | 0.0 |
| 21 | 0202 | 1.8 | 0935 | .1 | 1400 | .5 | 1929 | -.1 |
| 22 | 0235 | 1.9 | 0957 | .1 | 1436 | .7 | 2014 | -.1 |
| 23 | 0307 | 1.9 | 1019 | 0.0 | 1513 | .8 | 2056 | -.1 |
| 24 | 0339 | 1.8 | 1041 | 0.0 | 1551 | .9 | 2141 | -.1 |
| 25 | 0410 | 1.7 | 1102 | 0.0 | 1637 | 1.0 | 2227 | .1 |
| 26 | 0439 | 1.5 | 1127 | -.1 | 1719 | 1.2 | 2321 | .2 |
| 27 | 0510 | 1.3 | 1153 | -.1 | 1814 | 1.3 | ---- | --- |
| 28 | 0025 | .3 | 0542 | 1.0 | 1225 | -.1 | 1912 | 1.4 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 31**

PORT ALLEN TIDES
MARCH 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0149 | .4 | 0615 | .9 | 1258 | -.1 | 2026 | 1.4 |
| 2 | 0356 | .5 | 0653 | .6 | 1344 | 0.0 | 2145 | 1.5 |
| 3 | 1445 | 0.0 | 2303 | 1.6 | ---- | --- | ---- | --- |
| 4 | 0743 | .3 | 1049 | .3 | 1608 | .1 | ---- | --- |
| 5 | 0009 | 1.8 | 0815 | .2 | 1225 | .4 | 1730 | 0.0 |
| 6 | 0102 | 1.8 | 0850 | .1 | 1323 | .5 | 1837 | 0.0 |
| 7 | 0147 | 1.9 | 0915 | 0.0 | 1406 | .7 | 1932 | 0.0 |
| 8 | 0226 | 1.8 | 0940 | 0.0 | 1447 | .8 | 2021 | 0.0 |
| 9 | 0301 | 1.7 | 1002 | 0.0 | 1519 | .9 | 2109 | 0.0 |
| 10 | 0331 | 1.6 | 1024 | 0.0 | 1555 | 1.0 | 2152 | .1 |
| 11 | 0403 | 1.4 | 1042 | 0.0 | 1630 | 1.1 | 2237 | .2 |
| 12 | 0425 | 1.3 | 1102 | 0.0 | 1709 | 1.2 | 2323 | .3 |
| 13 | 0452 | 1.1 | 1119 | 0.0 | 1751 | 1.3 | ---- | --- |
| 14 | 0012 | .3 | 0515 | .9 | 1142 | 0.0 | 1835 | 1.3 |
| 15 | 0123 | .4 | 0537 | .8 | 1206 | .1 | 1925 | 1.3 |
| 16 | 0256 | .5 | 0559 | .6 | 1235 | .1 | 2034 | 1.3 |
| 17 | 1317 | .2 | 2150 | 1.4 | ---- | --- | ---- | --- |
| 18 | 1426 | .2 | 2300 | 1.4 | ---- | --- | ---- | --- |
| 19 | 0741 | .3 | 1124 | .4 | 1603 | .3 | ---- | --- |
| 20 | 2357 | 1.5* | 0759 | .2 | 1225 | .5 | 1722 | .2 |
| 21 | 0042 | 1.6 | 0817 | .1 | 1308 | .6 | 1824 | .1 |
| 22 | 0121 | 1.6 | 0839 | .1 | 1343 | .8 | 1920 | 0.0 |
| 23 | 0157 | 1.6 | 0858 | 0.0 | 1419 | .9 | 2009 | 0.0 |
| 24 | 0230 | 1.6 | 0919 | -.1 | 1457 | 1.1 | 2057 | 0.0 |
| 25 | 0303 | 1.4 | 0941 | -.1 | 1536 | 1.3 | 2150 | 0.0 |
| 26 | 0334 | 1.3 | 1005 | -.2 | 1618 | 1.4 | 2243 | .1 |
| 27 | 0406 | 1.1 | 1030 | -.2 | 1702 | 1.5 | ---- | --- |
| 28 | 2342 | .2* | 0441 | .9 | 1100 | -.2 | 1752 | 1.6 |
| 29 | 0056 | .3 | 0517 | .7 | 1131 | -.2 | 1848 | 1.6 |
| 30 | 0231 | .3 | 0600 | .5 | 1209 | -.1 | 1957 | 1.6 |
| 31 | 0432 | .3 | 0711 | .3 | 1256 | 0.0 | 2113 | 1.6 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 32**

PORT ALLEN TIDES
APRIL 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0611 | .2 | 0930 | .3 | 1409 | .2 | 2230 | 1.6 |
| 2 | 0657 | .1 | 1130 | .4 | 1556 | .2 | ---- | --- |
| 3 | 2335 | 1.6* | 0729 | .1 | 1233 | .5 | 1725 | .2 |
| 4 | 0028 | 1.6 | 0801 | 0.0 | 1318 | .7 | 1839 | .2 |
| 5 | 0113 | 1.5 | 0826 | 0.0 | 1357 | .9 | 1937 | .2 |
| 6 | 0151 | 1.4 | 0844 | -.1 | 1431 | 1.1 | 2029 | .2 |
| 7 | 0227 | 1.4 | 0905 | -.1 | 1503 | 1.2 | 2115 | .2 |
| 8 | 0256 | 1.2 | 0921 | -.1 | 1535 | 1.4 | 2201 | .2 |
| 9 | 0324 | 1.0 | 0941 | -.1 | 1608 | 1.4 | 2247 | .3 |
| 10 | 0349 | .9 | 0959 | -.1 | 1643 | 1.5 | 2333 | .3 |
| 11 | 0414 | .8 | 1018 | 0.0 | 1715 | 1.5 | ---- | --- |
| 12 | 0028 | .3 | 0436 | .6 | 1040 | 0.0 | 1757 | 1.5 |
| 13 | 0138 | .3 | 0511 | .5 | 1102 | .1 | 1843 | 1.4 |
| 14 | 0304 | .3 | 0543 | .4 | 1132 | .1 | 1942 | 1.4 |
| 15 | 0454 | .3 | 0659 | .3 | 1212 | .2 | 2047 | 1.4 |
| 16 | 0556 | .3 | 0938 | .3 | 1321 | .3 | 2154 | 1.4 |
| 17 | 0628 | .2 | 1115 | .4 | 1517 | .3 | 2256 | 1.4 |
| 18 | 0650 | .1 | 1207 | .6 | 1649 | .3 | ---- | --- |
| 19 | 2345 | 1.4* | 0711 | 0.0 | 1244 | .8 | 1805 | .3 |
| 20 | 0031 | 1.4 | 0733 | 0.0 | 1323 | 1.0 | 1911 | .2 |
| 21 | 0109 | 1.4 | 0756 | -.1 | 1400 | 1.2 | 2010 | .2 |
| 22 | 0148 | 1.3 | 0819 | -.2 | 1441 | 1.4 | 2107 | .1 |
| 23 | 0227 | 1.1 | 0844 | -.3 | 1520 | 1.7 | 2204 | .1 |
| 24 | 0305 | .9 | 0913 | -.3 | 1602 | 1.8 | 2303 | .1 |
| 25 | 0344 | .8 | 0941 | -.3 | 1645 | 1.9 | ---- | --- |
| 26 | 0008 | .2 | 0426 | .6 | 1014 | -.3 | 1737 | 1.9 |
| 27 | 0121 | .2 | 0511 | .4 | 1047 | -.2 | 1832 | 1.9 |
| 28 | 0247 | .2 | 0615 | .3 | 1132 | -.1 | 1935 | 1.8 |
| 29 | 0412 | .1 | 0757 | .3 | 1228 | .1 | 2042 | 1.7 |
| 30 | 0512 | .1 | 1005 | .3 | 1354 | .3 | 2147 | 1.6 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 33**

PORT ALLEN TIDES
MAY 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0559 | 0.0 | 1132 | .5 | 1544 | .3 | 2250 | 1.5 |
| 2 | 0634 | 0.0 | 1223 | .8 | 1722 | .3 | ---- | --- |
| 3 | 2345 | 1.4* | 0700 | -.1 | 1306 | .9 | 1839 | .3 |
| 4 | 0027 | 1.3 | 0724 | -.1 | 1341 | 1.2 | 1943 | .3 |
| 5 | 0106 | 1.1 | 0745 | -.1 | 1413 | 1.4 | 2038 | .3 |
| 6 | 0142 | .9 | 0804 | -.1 | 1445 | 1.4 | 2128 | .3 |
| 7 | 0214 | .9 | 0825 | -.1 | 1517 | 1.6 | 2216 | .3 |
| 8 | 0245 | .7 | 0845 | -.1 | 1546 | 1.7 | 2303 | .3 |
| 9 | 0317 | .6 | 0907 | -.1 | 1621 | 1.7 | ---- | --- |
| 10 | 2351 | .3* | 0345 | .5 | 0929 | -.1 | 1656 | 1.7 |
| 11 | 0044 | .3 | 0417 | .4 | 0953 | 0.0 | 1734 | 1.7 |
| 12 | 0142 | .3 | 0459 | .3 | 1018 | 0.0 | 1816 | 1.6 |
| 13 | 0247 | .3 | 0558 | .3 | 1057 | .1 | 1906 | 1.6 |
| 14 | 0350 | .2 | 0728 | .3 | 1135 | .2 | 1957 | 1.5 |
| 15 | 0433 | .2 | 0917 | .3 | 1244 | .3 | 2055 | 1.4 |
| 16 | 0509 | .1 | 1043 | .5 | 1435 | .4 | 2148 | 1.4 |
| 17 | 0537 | 0.0 | 1135 | .8 | 1620 | .4 | 2242 | 1.3 |
| 18 | 0602 | 0.0 | 1220 | 1.0 | 1753 | .4 | ---- | --- |
| 19 | 2331 | 1.2* | 0627 | -.1 | 1259 | 1.3 | 1909 | .3 |
| 20 | 0020 | 1.0 | 0655 | -.2 | 1341 | 1.5 | 2018 | .3 |
| 21 | 0105 | .9 | 0724 | -.3 | 1423 | 1.8 | 2123 | .2 |
| 22 | 0151 | .8 | 0756 | -.3 | 1505 | 2.0 | 2222 | .1 |
| 23 | 0236 | .6 | 0831 | -.3 | 1547 | 2.0 | 2321 | .1 |
| 24 | 0325 | .5 | 0907 | -.3 | 1635 | 2.1 | ---- | --- |
| 25 | 0025 | .1 | 0417 | .3 | 0946 | -.3 | 1725 | 2.1 |
| 26 | 0129 | .1 | 0516 | .3 | 1031 | -.2 | 1816 | 2.0 |
| 27 | 0231 | .1 | 0632 | .3 | 1120 | 0.0 | 1907 | 1.9 |
| 28 | 0324 | 0.0 | 0807 | .3 | 1219 | .2 | 2003 | 1.7 |
| 29 | 0415 | 0.0 | 0944 | .5 | 1342 | .3 | 2058 | 1.5 |
| 30 | 0456 | 0.0 | 1103 | .7 | 1528 | .5 | 2154 | 1.4 |
| 31 | 0526 | 0.0 | 1155 | .9 | 1712 | .5 | 2242 | 1.1 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 34**

PORT ALLEN TIDES
JUNE 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0555 | -.1 | 1241 | 1.2 | 1842 | .5 | ---- | --- |
| 2 | 2332 | .9* | 0621 | -.1 | 1316 | 1.4 | 1956 | .4 |
| 3 | 0017 | .9 | 0647 | -.1 | 1353 | 1.5 | 2054 | .4 |
| 4 | 0055 | .7 | 0711 | -.1 | 1425 | 1.7 | 2147 | .3 |
| 5 | 0137 | .6 | 0737 | -.1 | 1457 | 1.8 | 2232 | .3 |
| 6 | 0216 | .5 | 0802 | -.1 | 1530 | 1.8 | 2317 | .3 |
| 7 | 0251 | .4 | 0830 | -.1 | 1604 | 1.9 | ---- | --- |
| 8 | 2356 | .2* | 0333 | .4 | 0859 | -.1 | 1637 | 1.9 |
| 9 | 0041 | .2 | 0415 | .3 | 0931 | 0.0 | 1714 | 1.9 |
| 10 | 0123 | .2 | 0501 | .3 | 1003 | 0.0 | 1751 | 1.8 |
| 11 | 0202 | .2 | 0557 | .3 | 1041 | .1 | 1832 | 1.7 |
| 12 | 0245 | .2 | 0711 | .4 | 1133 | .3 | 1914 | 1.6 |
| 13 | 0320 | .1 | 0837 | .5 | 1236 | .3 | 1955 | 1.5 |
| 14 | 0352 | .1 | 0956 | .7 | 1415 | .5 | 2044 | 1.4 |
| 15 | 0422 | 0.0 | 1056 | .9 | 1608 | .6 | 2136 | 1.2 |
| 16 | 0456 | -.1 | 1148 | 1.3 | 1754 | .6 | 2232 | .9 |
| 17 | 0528 | -.2 | 1237 | 1.5 | 1925 | .4 | ---- | --- |
| 18 | 2328 | .8* | 0603 | -.3 | 1321 | 1.8 | 2039 | .3 |
| 19 | 0030 | .6 | 0642 | -.3 | 1407 | 2.0 | 2141 | .2 |
| 20 | 0129 | .5 | 0721 | -.3 | 1453 | 2.1 | 2237 | .1 |
| 21 | 0224 | .4 | 0806 | -.3 | 1538 | 2.2 | 2328 | .1 |
| 22 | 0320 | .4 | 0849 | -.3 | 1622 | 2.2 | ---- | --- |
| 23 | 0015 | 0.0 | 0416 | .4 | 0934 | -.2 | 1709 | 2.1 |
| 24 | 0104 | 0.0 | 0515 | .4 | 1023 | -.1 | 1754 | 2.0 |
| 25 | 0148 | 0.0 | 0622 | .4 | 1115 | .1 | 1836 | 1.9 |
| 26 | 0229 | 0.0 | 0737 | .6 | 1214 | .3 | 1922 | 1.6 |
| 27 | 0308 | 0.0 | 0901 | .7 | 1328 | .5 | 2005 | 1.4 |
| 28 | 0343 | 0.0 | 1017 | .9 | 1509 | .6 | 2047 | 1.2 |
| 29 | 0417 | 0.0 | 1116 | 1.1 | 1707 | .7 | 2133 | .9 |
| 30 | 0447 | 0.0 | 1210 | 1.4 | 1855 | .6 | 2226 | .8 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 35**

PORT ALLEN TIDES
JULY 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0519 | 0.0 | 1254 | 1.5 | 2017 | .5 | ---- | --- |
| 2 | 2324 | .6* | 0551 | 0.0 | 1329 | 1.7 | 2113 | .4 |
| 3 | 0023 | .5 | 0629 | 0.0 | 1404 | 1.8 | 2202 | .3 |
| 4 | 0115 | .5 | 0702 | -.1 | 1439 | 1.9 | 2234 | .3 |
| 5 | 0201 | .4 | 0737 | -.1 | 1514 | 2.0 | 2305 | .3 |
| 6 | 0246 | .4 | 0812 | -.1 | 1546 | 2.0 | ---- | --- |
| 7 | 2341 | .2* | 0326 | .4 | 0848 | 0.0 | 1618 | 2.0 |
| 8 | 0006 | .2 | 0405 | .5 | 0920 | 0.0 | 1651 | 2.0 |
| 9 | 0038 | .2 | 0451 | .5 | 1001 | .1 | 1723 | 1.9 |
| 10 | 0110 | .2 | 0543 | .6 | 1043 | .2 | 1755 | 1.8 |
| 11 | 0136 | .2 | 0642 | .7 | 1135 | .3 | 1829 | 1.6 |
| 12 | 0206 | .1 | 0752 | .8 | 1241 | .5 | 1906 | 1.4 |
| 13 | 0235 | .1 | 0904 | 1.0 | 1414 | .7 | 1948 | 1.2 |
| 14 | 0311 | 0.0 | 1017 | 1.2 | 1616 | .7 | 2033 | .9 |
| 15 | 0350 | 0.0 | 1119 | 1.4 | 1826 | .6 | 2139 | .8 |
| 16 | 0435 | -.1 | 1217 | 1.7 | 1955 | .5 | 2258 | .6 |
| 17 | 0525 | -.1 | 1307 | 2.0 | 2057 | .3 | ---- | --- |
| 18 | 0018 | .5 | 0615 | -.2 | 1355 | 2.1 | 2150 | .2 |
| 19 | 0127 | .5 | 0706 | -.2 | 1440 | 2.2 | 2225 | .2 |
| 20 | 0224 | .5 | 0754 | -.2 | 1524 | 2.3 | 2307 | .1 |
| 21 | 0317 | .5 | 0847 | -.2 | 1606 | 2.2 | ---- | --- |
| 22 | 2344 | .1* | 0409 | .6 | 0935 | -.1 | 1645 | 2.1 |
| 23 | 0019 | .1 | 0501 | .7 | 1021 | 0.0 | 1723 | 2.0 |
| 24 | 0049 | .1 | 0554 | .8 | 1113 | .2 | 1802 | 1.7 |
| 25 | 0121 | .1 | 0656 | .9 | 1209 | .4 | 1834 | 1.5 |
| 26 | 0153 | .1 | 0802 | 1.0 | 1321 | .6 | 1906 | 1.3 |
| 27 | 0223 | .2 | 0916 | 1.1 | 1457 | .8 | 1938 | 1.0 |
| 28 | 0258 | .2 | 1027 | 1.3 | 1717 | .8 | 2016 | .9 |
| 29 | 0337 | .2 | 1126 | 1.4 | 1927 | .6 | 2115 | .7 |
| 30 | 0420 | .2 | 1217 | 1.6 | 2039 | .5 | 2249 | .6 |
| 31 | 0509 | .2 | 1302 | 1.7 | 2108 | .4 | ---- | --- |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 36**

PORT ALLEN TIDES
AUGUST 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0016 | .5 | 0559 | .1 | 1340 | 1.9 | 2136 | .3 |
| 2 | 0113 | .5 | 0645 | .1 | 1417 | 1.9 | 2201 | .3 |
| 3 | 0157 | .6 | 0727 | .1 | 1450 | 2.0 | 2229 | .3 |
| 4 | 0236 | .6 | 0806 | 0.0 | 1522 | 2.0 | 2252 | .3 |
| 5 | 0315 | .7 | 0845 | 0.0 | 1551 | 2.0 | 2316 | .3 |
| 6 | 0354 | .8 | 0923 | .1 | 1623 | 2.0 | ---- | --- |
| 7 | 2338 | .2* | 0436 | .9 | 1005 | .2 | 1651 | 1.8 |
| 8 | 0004 | .2 | 0518 | .9 | 1051 | .3 | 1720 | 1.6 |
| 9 | 0028 | .2 | 0610 | 1.0 | 1143 | .4 | 1751 | 1.4 |
| 10 | 0054 | .1 | 0709 | 1.2 | 1257 | .6 | 1823 | 1.3 |
| 11 | 0126 | .1 | 0821 | 1.4 | 1435 | .7 | 1859 | 1.0 |
| 12 | 0205 | .1 | 0936 | 1.5 | 1658 | .7 | 1947 | .8 |
| 13 | 0254 | .1 | 1050 | 1.7 | 1908 | .5 | 2117 | .6 |
| 14 | 0353 | .1 | 1156 | 1.9 | 2014 | .4 | 2313 | .5 |
| 15 | 0501 | .1 | 1249 | 2.0 | 2049 | .3 | ---- | --- |
| 16 | 0036 | .5 | 0608 | 0.0 | 1339 | 2.1 | 2124 | .3 |
| 17 | 0137 | .6 | 0707 | 0.0 | 1423 | 2.2 | 2155 | .2 |
| 18 | 0227 | .7 | 0756 | 0.0 | 1505 | 2.1 | 2226 | .2 |
| 19 | 0312 | .9 | 0848 | 0.0 | 1541 | 2.0 | 2253 | .2 |
| 20 | 0356 | .9 | 0937 | .1 | 1616 | 2.0 | 2320 | .2 |
| 21 | 0438 | 1.0 | 1022 | .2 | 1648 | 1.7 | ---- | --- |
| 22 | 2343 | .2* | 0524 | 1.1 | 1111 | .3 | 1717 | 1.5 |
| 23 | 0009 | .2 | 0610 | 1.2 | 1206 | .5 | 1742 | 1.3 |
| 24 | 0033 | .2 | 0706 | 1.3 | 1313 | .7 | 1807 | 1.1 |
| 25 | 0059 | .3 | 0805 | 1.4 | 1455 | .8 | 1835 | .9 |
| 26 | 0131 | .3 | 0921 | 1.4 | ---- | --- | ---- | --- |
| 27 | 0217 | .3 | 1030 | 1.5 | ---- | --- | ---- | --- |
| 28 | 0319 | .3 | 1135 | 1.6 | 2003 | .5 | 2311 | .6 |
| 29 | 0435 | .3 | 1225 | 1.7 | 2029 | .4 | ---- | --- |
| 30 | 0025 | .6 | 0538 | .3 | 1308 | 1.8 | 2050 | .3 |
| 31 | 0110 | .7 | 0631 | .3 | 1343 | 1.9 | 2112 | .3 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 37**

PORT ALLEN TIDES
SEPTEMBER 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0147 | .8 | 0715 | .2 | 1418 | 2.0 | 2134 | .3 |
| 2 | 0223 | .9 | 0759 | .2 | 1450 | 1.9 | 2155 | .3 |
| 3 | 0258 | 1.0 | 0843 | .2 | 1518 | 1.9 | 2214 | .2 |
| 4 | 0334 | 1.1 | 0925 | .2 | 1547 | 1.8 | 2236 | .2 |
| 5 | 0413 | 1.3 | 1012 | .3 | 1615 | 1.6 | 2257 | .2 |
| 6 | 0456 | 1.4 | 1103 | .3 | 1645 | 1.4 | 2323 | .1 |
| 7 | 0547 | 1.5 | 1204 | .5 | 1717 | 1.2 | ---- | --- |
| 8 | 2351 | .1* | 0640 | 1.6 | 1320 | .6 | 1749 | 1.0 |
| 9 | 0023 | .1 | 0746 | 1.6 | 1520 | .7 | 1826 | .8 |
| 10 | 0105 | .2 | 0902 | 1.7 | 1747 | .5 | 1939 | .6 |
| 11 | 0205 | .3 | 1021 | 1.8 | 1903 | .4 | 2209 | .5 |
| 12 | 0325 | .3 | 1130 | 1.9 | 1941 | .3 | ---- | --- |
| 13 | 2351 | .6* | 0451 | .3 | 1228 | 2.0 | 2013 | .3 |
| 14 | 0053 | .7 | 0606 | .3 | 1316 | 2.0 | 2042 | .2 |
| 15 | 0142 | .9 | 0709 | .2 | 1359 | 2.0 | 2110 | .2 |
| 16 | 0221 | 1.0 | 0801 | .2 | 1436 | 1.9 | 2134 | .2 |
| 17 | 0300 | 1.2 | 0853 | .2 | 1510 | 1.8 | 2157 | .2 |
| 18 | 0339 | 1.3 | 0939 | .3 | 1540 | 1.6 | 2218 | .2 |
| 19 | 0417 | 1.4 | 1027 | .3 | 1609 | 1.4 | 2236 | .2 |
| 20 | 0452 | 1.5 | 1118 | .4 | 1637 | 1.2 | 2257 | .2 |
| 21 | 0534 | 1.5 | 1213 | .5 | 1659 | 1.0 | 2318 | .3 |
| 22 | 0616 | 1.6 | 1320 | .6 | 1724 | .9 | ---- | --- |
| 23 | 2340 | .3* | 0709 | 1.5 | 1503 | .7 | 1742 | .8 |
| 24 | 0009 | .3 | 0818 | 1.5 | ---- | --- | ---- | --- |
| 25 | 0051 | .4 | 0930 | 1.6 | 1845 | .4 | 2135 | .5 |
| 26 | 0206 | .4 | 1039 | 1.6 | 1911 | .4 | ---- | --- |
| 27 | 2327 | .6* | 0349 | .5 | 1136 | 1.7 | 1933 | .3 |
| 28 | 0020 | .7 | 0512 | .4 | 1221 | 1.7 | 1953 | .3 |
| 29 | 0057 | .9 | 0614 | .3 | 1301 | 1.8 | 2012 | .3 |
| 30 | 0130 | 1.0 | 0707 | .3 | 1335 | 1.8 | 2034 | .2 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 38**

PORT ALLEN TIDES
OCTOBER 1986
21 DEG 54 MIN N. 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0206 | 1.2 | 0756 | .3 | 1407 | 1.7 | 2052 | .2 |
| 2 | 0238 | 1.4 | 0844 | .3 | 1439 | 1.5 | 2115 | .1 |
| 3 | 0313 | 1.5 | 0933 | .3 | 1511 | 1.4 | 2135 | .1 |
| 4 | 0355 | 1.7 | 1026 | .3 | 1543 | 1.3 | 2159 | 0.0 |
| 5 | 0437 | 1.8 | 1122 | .4 | 1615 | 1.0 | 2228 | 0.0 |
| 6 | 0521 | 1.9 | 1232 | .4 | 1650 | .9 | 2256 | .1 |
| 7 | 0618 | 1.9 | 1358 | .5 | 1729 | .7 | 2332 | .1 |
| 8 | 0720 | 1.9 | 1552 | .4 | 1835 | .5 | ---- | --- |
| 9 | 0017 | .2 | 0833 | 1.9 | 1728 | .4 | 2050 | .5 |
| 10 | 0126 | .3 | 0950 | 1.9 | 1823 | .3 | 2300 | .6 |
| 11 | 0312 | .4 | 1059 | 1.9 | 1858 | .3 | ---- | --- |
| 12 | 0009 | .8 | 0455 | .4 | 1154 | 1.8 | 1927 | .2 |
| 13 | 0055 | .9 | 0611 | .4 | 1243 | 1.8 | 1953 | .2 |
| 14 | 0134 | 1.1 | 0714 | .3 | 1325 | 1.6 | 2017 | .1 |
| 15 | 0212 | 1.4 | 0810 | .3 | 1400 | 1.5 | 2039 | .1 |
| 16 | 0248 | 1.5 | 0901 | .3 | 1433 | 1.4 | 2057 | .1 |
| 17 | 0318 | 1.6 | 0951 | .3 | 1501 | 1.2 | 2116 | .1 |
| 18 | 0354 | 1.7 | 1038 | .4 | 1529 | 1.0 | 2136 | .1 |
| 19 | 0427 | 1.8 | 1130 | .4 | 1555 | .9 | 2154 | .2 |
| 20 | 0502 | 1.8 | 1225 | .5 | 1623 | .8 | 2216 | .2 |
| 21 | 0541 | 1.8 | 1335 | .5 | 1648 | .7 | 2238 | .3 |
| 22 | 0629 | 1.7 | 1508 | .5 | 1731 | .6 | 2306 | .3 |
| 23 | 0724 | 1.7 | 1634 | .4 | 1903 | .5 | ---- | --- |
| 24 | 2344 | .4* | 0827 | 1.6 | 1733 | .4 | 2153 | .5 |
| 25 | 0050 | .4 | 0931 | 1.6 | 1805 | .3 | 2319 | .6 |
| 26 | 0253 | .5 | 1030 | 1.6 | 1829 | .3 | ---- | --- |
| 27 | 0001 | .8 | 0436 | .5 | 1122 | 1.6 | 1851 | .2 |
| 28 | 0036 | 1.0 | 0554 | .5 | 1207 | 1.5 | 1909 | .2 |
| 29 | 0108 | 1.2 | 0655 | .4 | 1246 | 1.4 | 1932 | .1 |
| 30 | 0143 | 1.4 | 0754 | .4 | 1321 | 1.4 | 1954 | 0.0 |
| 31 | 0219 | 1.6 | 0850 | .3 | 1400 | 1.2 | 2017 | -.1 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 39**

PORT ALLEN TIDES
NOVEMBER 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0257 | 1.9 | 0944 | .3 | 1435 | 1.0 | 2045 | -.1 |
| 2 | 0339 | 2.0 | 1043 | .3 | 1514 | .9 | 2113 | -.1 |
| 3 | 0421 | 2.1 | 1145 | .3 | 1553 | .7 | 2146 | -.1 |
| 4 | 0507 | 2.1 | 1254 | .3 | 1641 | .6 | 2221 | 0.0 |
| 5 | 0602 | 2.1 | 1414 | .3 | 1737 | .5 | 2302 | .1 |
| 6 | 0701 | 2.0 | 1536 | .3 | 1912 | .4 | ---- | --- |
| 7 | 2353 | .2* | 0804 | 1.9 | 1639 | .3 | 2121 | .5 |
| 8 | 0107 | .3 | 0911 | 1.8 | 1728 | .2 | 2302 | .7 |
| 9 | 0300 | .5 | 1013 | 1.7 | 1803 | .1 | ---- | --- |
| 10 | 0001 | .9 | 0450 | .6 | 1109 | 1.5 | 1831 | .1 |
| 11 | 0043 | 1.1 | 0616 | .5 | 1157 | 1.4 | 1859 | 0.0 |
| 12 | 0125 | 1.4 | 0725 | .5 | 1239 | 1.2 | 1922 | 0.0 |
| 13 | 0157 | 1.5 | 0825 | .4 | 1318 | 1.1 | 1945 | 0.0 |
| 14 | 0229 | 1.7 | 0919 | .4 | 1354 | .9 | 2004 | 0.0 |
| 15 | 0301 | 1.8 | 1010 | .4 | 1429 | .8 | 2025 | 0.0 |
| 16 | 0333 | 1.9 | 1056 | .3 | 1500 | .7 | 2049 | 0.0 |
| 17 | 0408 | 1.9 | 1142 | .3 | 1532 | .6 | 2111 | 0.0 |
| 18 | 0440 | 1.9 | 1234 | .3 | 1604 | .5 | 2136 | .1 |
| 19 | 0518 | 1.9 | 1330 | .3 | 1646 | .5 | 2205 | .2 |
| 20 | 0600 | 1.8 | 1429 | .3 | 1742 | .4 | 2237 | .3 |
| 21 | 0642 | 1.8 | 1527 | .3 | 1907 | .4 | 2309 | .3 |
| 22 | 0733 | 1.7 | 1613 | .3 | 2106 | .5 | ---- | --- |
| 23 | 0014 | .4 | 0825 | 1.6 | 1645 | .3 | 2233 | .7 |
| 24 | 0204 | .6 | 0920 | 1.4 | 1713 | .2 | ---- | --- |
| 25 | 2324 | .9* | 0357 | .6 | 1012 | 1.4 | 1739 | .1 |
| 26 | 0007 | 1.1 | 0537 | .6 | 1101 | 1.3 | 1805 | 0.0 |
| 27 | 0045 | 1.4 | 0655 | .5 | 1153 | 1.1 | 1831 | -.1 |
| 28 | 0121 | 1.6 | 0801 | .4 | 1239 | .9 | 1900 | -.2 |
| 29 | 0200 | 1.9 | 0905 | .3 | 1324 | .8 | 1932 | -.2 |
| 30 | 0242 | 2.0 | 1002 | .3 | 1411 | .7 | 2007 | -.3 |

* -- TIDE OCCURS ON PREVIOUS DATE.

**TABLE 40**

PORT ALLEN TIDES
DECEMBER 1986
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

| DATE | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT | TIME HST | HGT FT |
|---|---|---|---|---|---|---|---|---|
| 1 | 0324 | 2.2 | 1101 | .2 | 1459 | .6 | 2044 | -.3 |
| 2 | 0409 | 2.3 | 1157 | .2 | 1547 | .5 | 2123 | -.2 |
| 3 | 0457 | 2.2 | 1256 | .2 | 1643 | .4 | 2205 | -.1 |
| 4 | 0546 | 2.1 | 1353 | .2 | 1752 | .4 | 2250 | 0.0 |
| 5 | 0637 | 2.0 | 1450 | .1 | 1920 | .4 | ---- | --- |
| 6 | 2349 | .2* | 0730 | 1.9 | 1539 | .1 | 2057 | .6 |
| 7 | 0105 | .4 | 0823 | 1.6 | 1625 | .1 | 2229 | .8 |
| 8 | 0248 | .6 | 0917 | 1.4 | 1701 | 0.0 | ---- | --- |
| 9 | 2335 | 1.0* | 0445 | .7 | 1012 | 1.2 | 1730 | 0.0 |
| 10 | 0021 | 1.3 | 0626 | .6 | 1108 | 1.0 | 1759 | 0.0 |
| 11 | 0103 | 1.4 | 0745 | .5 | 1153 | .9 | 1826 | -.1 |
| 12 | 0140 | 1.6 | 0852 | .4 | 1242 | .7 | 1855 | -.1 |
| 13 | 0215 | 1.8 | 0944 | .3 | 1324 | .6 | 1923 | -.1 |
| 14 | 0249 | 1.9 | 1026 | .3 | 1406 | .5 | 1952 | -.1 |
| 15 | 0321 | 2.0 | 1108 | .3 | 1445 | .5 | 2020 | -.1 |
| 16 | 0352 | 2.0 | 1143 | .3 | 1524 | .4 | 2052 | 0.0 |
| 17 | 0424 | 2.0 | 1222 | .3 | 1601 | .4 | 2121 | 0.0 |
| 18 | 0459 | 1.9 | 1301 | .3 | 1646 | .4 | 2153 | .1 |
| 19 | 0533 | 1.9 | 1339 | .2 | 1737 | .4 | 2231 | .2 |
| 20 | 0608 | 1.8 | 1415 | .2 | 1844 | .5 | 2311 | .3 |
| 21 | 0647 | 1.6 | 1450 | .2 | 2001 | .6 | ---- | --- |
| 22 | 0009 | .4 | 0726 | 1.5 | 1522 | .1 | 2127 | .7 |
| 23 | 0135 | .6 | 0809 | 1.4 | 1553 | .1 | 2235 | .9 |
| 24 | 0332 | .7 | 0856 | 1.1 | 1625 | 0.0 | ---- | --- |
| 25 | 2328 | 1.2* | 0534 | .7 | 0955 | .9 | 1700 | -.1 |
| 26 | 0017 | 1.5 | 0712 | .5 | 1057 | .8 | 1738 | -.2 |
| 27 | 0102 | 1.8 | 0826 | .4 | 1203 | .6 | 1818 | -.3 |
| 28 | 0147 | 2.0 | 0922 | .3 | 1305 | .5 | 1901 | -.3 |
| 29 | 0230 | 2.1 | 1013 | .2 | 1401 | .4 | 1943 | -.3 |
| 30 | 0315 | 2.3 | 1103 | .1 | 1455 | .4 | 2029 | -.3 |
| 31 | 0400 | 2.3 | 1145 | 0.0 | 1549 | .4 | 2115 | -.3 |

* -- TIDE OCCURS ON PREVIOUS DATE.

## APPENDIX A

## HEIGHT OF THE TIDE AT ANY TIME*

The height of the tide at times intermediate to the times of high and low water is needed on occasion, and may be computed by either numerical or graphical methods. One example of each method is presented here, using the predicted tides for a day at Point Mugu.

Problem: Given that the predicted times and heights of the tides are:

| Time | Height | Time | Height | Time | Height | Time | Height |
|---|---|---|---|---|---|---|---|
| 0039 | 4.9 | 0814 | 0.2 | 1510 | 3.1 | 1933 | 2.4 |

Find the height of the tide at 0300.

### Numerical Method

The duration of fall is $08^h\ 14^m - 00^h\ 39^m = 7^h\ 35^m$.

The time after high water for which the height is required is $03^h\ 00^m - 00^h\ 39^m = 02^h\ 21^m$.

The range of tide is 4.9–0.2 = 4.7 feet.

Entering table A-1 at the duration of fall of $7^h\ 40^m$, which is the nearest value to $7^h\ 35^m$, the nearest value on the horizontal line to $2^h\ 21^m$ is $2^h\ 18^m$ after high water. Following down this column to its intersection with a range of 4.5 feet which is the nearest tabular value to 4.7 feet, one obtains 0.9 which, being calculated from high water, must be subtracted from it. The approximate height at $03^h\ 00^m$ is, therefore, 4.9 0.9 = 4.0 feet.

When the duration of rise or fall is greater than $10^h\ 40^m$, enter the table with one-half the given duration and with one-half the time from the nearest high or low water; but if the duration of rise or fall is less than 4 hours, enter the table with double the given duration and with double the time from the nearest high or low water.

*This information is adapted from table 3 of the data source for this publication (see page 1).

## Table A-1. Height of the Tide at Any Time

| Duration of rise or fall, see footnote. | Time from the nearest high water or low water | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. | h. m. |
| 4 00 | 0 08 | 0 16 | 0 24 | 0 32 | 0 40 | 0 48 | 0 56 | 1 04 | 1 12 | 1 20 | 1 28 | 1 36 | 1 44 | 1 52 | 2 00 | |
| 4 20 | 0 09 | 0 17 | 0 26 | 0 35 | 0 43 | 0 52 | 1 01 | 1 09 | 1 18 | 1 27 | 1 35 | 1 44 | 1 53 | 2 01 | 2 10 | |
| 4 40 | 0 09 | 0 19 | 0 28 | 0 37 | 0 47 | 0 56 | 1 05 | 1 15 | 1 24 | 1 33 | 1 43 | 1 52 | 2 01 | 2 11 | 2 20 | |
| 5 00 | 0 10 | 0 20 | 0 30 | 0 40 | 0 50 | 1 00 | 1 10 | 1 20 | 1 30 | 1 40 | 1 50 | 2 00 | 2 10 | 2 20 | 2 30 | |
| 5 20 | 0 11 | 0 21 | 0 32 | 0 43 | 0 53 | 1 04 | 1 15 | 1 25 | 1 36 | 1 47 | 1 57 | 2 08 | 2 19 | 2 29 | 2 40 | |
| 5 40 | 0 11 | 0 23 | 0 34 | 0 45 | 0 57 | 1 08 | 1 19 | 1 31 | 1 42 | 1 53 | 2 05 | 2 16 | 2 27 | 2 39 | 2 50 | |
| 6 00 | 0 12 | 0 24 | 0 36 | 0 48 | 1 00 | 1 12 | 1 24 | 1 36 | 1 48 | 2 00 | 2 12 | 2 24 | 2 36 | 2 48 | 3 00 | |
| 6 20 | 0 13 | 0 25 | 0 38 | 0 51 | 1 03 | 1 16 | 1 29 | 1 41 | 1 54 | 2 07 | 2 19 | 2 32 | 2 45 | 2 57 | 3 10 | |
| 6 40 | 0 13 | 0 27 | 0 40 | 0 53 | 1 07 | 1 20 | 1 33 | 1 47 | 2 00 | 2 13 | 2 27 | 2 40 | 2 53 | 3 07 | 3 20 | |
| 7 00 | 0 14 | 0 28 | 0 42 | 0 56 | 1 10 | 1 24 | 1 38 | 1 52 | 2 06 | 2 20 | 2 34 | 2 48 | 3 02 | 3 16 | 3 30 | |
| 7 20 | 0 15 | 0 29 | 0 44 | 0 59 | 1 13 | 1 28 | 1 43 | 1 57 | 2 12 | 2 27 | 2 41 | 2 56 | 3 11 | 3 25 | 3 40 | |
| 7 40 | 0 15 | 0 31 | 0 46 | 1 01 | 1 17 | 1 32 | 1 47 | 2 03 | 2 18 | 2 33 | 2 49 | 3 04 | 3 19 | 3 35 | 3 50 | |
| 8 00 | 0 16 | 0 32 | 0 48 | 1 04 | 1 20 | 1 36 | 1 52 | 2 08 | 2 24 | 2 40 | 2 56 | 3 12 | 3 28 | 3 44 | 4 00 | |
| 8 20 | 0 17 | 0 33 | 0 50 | 1 07 | 1 23 | 1 40 | 1 57 | 2 13 | 2 30 | 2 47 | 3 03 | 3 20 | 3 37 | 3 53 | 4 10 | |
| 8 40 | 0 17 | 0 35 | 0 52 | 1 09 | 1 27 | 1 44 | 2 01 | 2 19 | 2 36 | 2 53 | 3 11 | 3 28 | 3 45 | 4 03 | 4 20 | |
| 9 00 | 0 18 | 0 36 | 0 54 | 1 12 | 1 30 | 1 48 | 2 06 | 2 24 | 2 42 | 3 00 | 3 18 | 3 36 | 3 54 | 4 12 | 4 30 | |
| 9 20 | 0 19 | 0 37 | 0 56 | 1 15 | 1 33 | 1 52 | 2 11 | 2 29 | 2 48 | 3 07 | 3 25 | 3 44 | 4 03 | 4 21 | 4 40 | |
| 9 40 | 0 19 | 0 39 | 0 58 | 1 17 | 1 37 | 1 56 | 2 15 | 2 35 | 2 54 | 3 13 | 3 33 | 3 52 | 4 11 | 4 31 | 4 50 | |
| 10 00 | 0 20 | 0 40 | 1 00 | 1 20 | 1 40 | 2 00 | 2 20 | 2 40 | 3 00 | 3 20 | 3 40 | 4 00 | 4 20 | 4 40 | 5 00 | |
| 10 20 | 0 21 | 0 41 | 1 02 | 1 23 | 1 43 | 2 04 | 2 25 | 2 45 | 3 06 | 3 27 | 3 47 | 4 08 | 4 29 | 4 49 | 5 10 | |
| 10 40 | 0 21 | 0 43 | 1 04 | 1 25 | 1 47 | 2 08 | 2 29 | 2 51 | 3 12 | 3 33 | 3 55 | 4 16 | 4 37 | 4 59 | 5 20 | |

| Range of tide, see footnote. | Correction to height | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. | Ft. |
| 0.5 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0.1 | 0.1 | 0.1 | 0 1 | 0.1 | 0 2 | 0 2 | 0 2 | 0 2 | |
| 1.0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 1 | 0 1 | 0.1 | 0.2 | 0.2 | 0 2 | 0 3 | 0 3 | 0 4 | 0 4 | 0 5 | |
| 1.5 | 0 0 | 0 0 | 0 0 | 0 1 | 0 1 | 0 1 | 0.2 | 0.2 | 0 3 | 0 4 | 0 4 | 0 5 | 0 6 | 0 7 | 0 8 | |
| 2.0 | 0 0 | 0 0 | 0 0 | 0 1 | 0 1 | 0 2 | 0.3 | 0.3 | 0.4 | 0 5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | |
| 2.5 | 0 0 | 0 0 | 0 1 | 0 1 | 0 2 | 0 2 | 0.3 | 0.4 | 0 5 | 0.6 | 0.7 | 0.9 | 1 0 | 1.1 | 1.2 | |
| 3.0 | 0 0 | 0 0 | 0 1 | 0 1 | 0 2 | 0 3 | 0.4 | 0.5 | 0 6 | 0 8 | 0.9 | 1 0 | 1 2 | 1.3 | 1.5 | |
| 3.5 | 0 0 | 0 0 | 0 1 | 0 2 | 0 2 | 0 3 | 0 4 | 0.6 | 0 7 | 0 9 | 1.0 | 1 2 | 1 4 | 1.6 | 1.8 | |
| 4.0 | 0 0 | 0 0 | 0 1 | 0 2 | 0 3 | 0 4 | 0.5 | 0.7 | 0 8 | 1 0 | 1.2 | 1 4 | 1 6 | 1.8 | 2 0 | |
| 4.5 | 0 0 | 0 0 | 0 1 | 0 2 | 0 3 | 0.4 | 0.6 | 0.7 | 0.9 | 1.1 | 1.3 | 1 6 | 1.8 | 2 0 | 2 2 | |
| 5.0 | 0 0 | 0 1 | 0 1 | 0 2 | 0 3 | 0 5 | 0.6 | 0 8 | 1.0 | 1.2 | 1.5 | 1.7 | 2 0 | 2.2 | 2.5 | |
| 5.5 | 0 0 | 0 1 | 0 1 | 0 2 | 0 4 | 0.5 | 0.7 | 0.9 | 1.1 | 1.4 | 1.6 | 1.9 | 2 2 | 2.5 | 2.8 | |
| 6.0 | 0 0 | 0 1 | 0 1 | 0 3 | 0 4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.5 | 1.8 | 2.1 | 2 4 | 2.7 | 3.0 | |
| 6.5 | 0 0 | 0 1 | 0 2 | 0 3 | 0 4 | 0.6 | 0.8 | 1.1 | 1.3 | 1.6 | 1.9 | 2.2 | 2 6 | 2.9 | 3.2 | |
| 7.0 | 0 0 | 0 1 | 0 2 | 0 3 | 0 5 | 0.7 | 0 9 | 1.2 | 1.4 | 1.8 | 2.1 | 2 4 | 2.8 | 3.1 | 3.5 | |
| 7.5 | 0 0 | 0 1 | 0 2 | 0 3 | 0 5 | 0 7 | 1.0 | 1.2 | 1.5 | 1 9 | 2.2 | 2.6 | 3.0 | 3.4 | 3 8 | |
| 8.0 | 0 0 | 0 1 | 0 2 | 0 3 | 0 5 | 0.8 | 1.0 | 1.3 | 1.6 | 2 0 | 2.4 | 2 8 | 3.2 | 3 6 | 4.0 | |
| 8.5 | 0 0 | 0 1 | 0 2 | 0 4 | 0 6 | 0 8 | 1.1 | 1.4 | 1.8 | 2.1 | 2.5 | 2 9 | 3.4 | 3.8 | 4.2 | |
| 9.0 | 0 0 | 0 1 | 0 2 | 0 4 | 0 6 | 0.9 | 1.2 | 1.5 | 1 9 | 2.2 | 2.7 | 3 1 | 3 | 4 0 | 4.5 | |
| 9.5 | 0 0 | 0 1 | 0 2 | 0 4 | 0 6 | 0.9 | 1.2 | 1.6 | 2 0 | 2.4 | 2.8 | 3.3 | 3.8 | 4 3 | 4.8 | |
| 10.0 | 0 0 | 0 1 | 0 2 | 0 4 | 0 7 | 1 0 | 1.3 | 1.7 | 2.1 | 2.5 | 3 0 | 3 5 | 4 0 | 4.5 | 5.0 | |
| 10.5 | 0 0 | 0 1 | 0 3 | 0 5 | 0 7 | 1 0 | 1.3 | 1 7 | 2 2 | 2 6 | 3.1 | 3.6 | 4 2 | 4.7 | 5.2 | |
| 11.0 | 0 0 | 0 1 | 0 3 | 0 5 | 0 7 | 1 1 | 1.4 | 1.8 | 2 3 | 2 8 | 3.3 | 3.8 | 4.4 | 4 9 | 5.5 | |
| 11.5 | 0 0 | 0 1 | 0 3 | 0 5 | 0 8 | 1 1 | 1.5 | 1.9 | 2 4 | 2 9 | 3.4 | 4 0 | 4.6 | 5 1 | 5.8 | |
| 12.0 | 0 0 | 0 1 | 0 3 | 0 5 | 0 8 | 1 1 | 1.5 | 2 0 | 2.5 | 3 0 | 3.6 | 4 1 | 4 8 | 5.4 | 6.0 | |
| 12.5 | 0 0 | 0 1 | 0 3 | 0 5 | 0 8 | 1.2 | 1.6 | 2.1 | 2.6 | 3.1 | 3.7 | 4.3 | 5.0 | 5.6 | 6.2 | |
| 13.0 | 0 0 | 0 1 | 0 3 | 0 6 | 0 9 | 1.2 | 1.7 | 2 2 | 2 7 | 3.2 | 3.9 | 4 5 | 5 1 | 5 8 | 6.5 | |
| 13.5 | 0 0 | 0 1 | 0 3 | 0 6 | 0 9 | 1 3 | 1.7 | 2.2 | 2 8 | 3.4 | 4 0 | 4 7 | 5.3 | 6.0 | 6.8 | |
| 14.0 | 0 0 | 0 2 | 0 3 | 0 6 | 0 9 | 1 3 | 1.8 | 2.3 | 2 9 | 3.5 | 4.2 | 4 8 | 5.5 | 6 3 | 7.0 | |
| 14.5 | 0 0 | 0 2 | 0 4 | 0 6 | 1 0 | 1.4 | 1.9 | 2.4 | 3.0 | 3.6 | 4.3 | 5 0 | 5.7 | 6.5 | 7.2 | |
| 15.0 | 0 0 | 0 2 | 0 4 | 0 6 | 1 0 | 1.4 | 1.9 | 2.5 | 3.1 | 3.8 | 4.4 | 5 2 | 5.9 | 6.7 | 7.5 | |
| 15.5 | 0 0 | 0 2 | 0 4 | 0 7 | 1 0 | 1 5 | 2.0 | 2.6 | 3.2 | 3.9 | 4.6 | 5 4 | 6 1 | 6.9 | 7 8 | |
| 16.0 | 0 0 | 0 2 | 0 4 | 0 7 | 1 1 | 1.5 | 2.1 | 2.6 | 3.3 | 4.0 | 4.7 | 5 5 | 6.3 | 7.2 | 8.0 | |
| 16.5 | 0 0 | 0 2 | 0 4 | 0 7 | 1 1 | 1 6 | 2.1 | 2.7 | 3.4 | 4.1 | 4.9 | 5.7 | 6 5 | 7.4 | 8 2 | |
| 17.0 | 0 0 | 0 2 | 0 4 | 0 7 | 1 1 | 1 6 | 2.2 | 2.8 | 3.5 | 4.2 | 5.0 | 5.9 | 6.7 | 7.6 | 8.5 | |
| 17.5 | 0 0 | 0 2 | 0 4 | 0 8 | 1 2 | 1.7 | 2.2 | 2.9 | 3.6 | 4.4 | 5.2 | 6.0 | 6.9 | 7.8 | 8.8 | |
| 18.0 | 0 0 | 0 2 | 0 4 | 0 8 | 1 2 | 1.7 | 2.3 | 3.0 | 3.7 | 4.5 | 5.3 | 6.2 | 7.1 | 8.1 | 9.0 | |
| 18.5 | 0 1 | 0 2 | 0 5 | 0 8 | 1 2 | 1 8 | 2.4 | 3.1 | 3.8 | 4.6 | 5.5 | 6 4 | 7.3 | 8.3 | 9 2 | |
| 19.0 | 0 1 | 0 2 | 0 5 | 0 8 | 1 3 | 1 8 | 2.4 | 3.1 | 3.9 | 4.8 | 5.6 | 6.6 | 7.5 | 8.5 | 9.5 | |
| 19.5 | 0 1 | 0 2 | 0 5 | 0 8 | 1 3 | 1 9 | 2.5 | 3 2 | 4 0 | 4.9 | 5 8 | 6.7 | 7.7 | 8.7 | 9 8 | |
| 20.0 | 0 1 | 0 2 | 0 5 | 0 9 | 1 3 | 1 9 | 2 6 | 3 3 | 1 1 | 5 0 | 5 9 | 6 9 | 7 9 | 9 0 | 10 0 | |

Obtain from the predictions the high water and low water, one of which is before and the other after the time for which the height is required. The difference between the times of occurrence of these tides is the duration of rise or fall, and the difference between their heights is the range of tide for the above table. Find the difference between the nearest high or low water and the time for which the height is required.

Enter the table with the duration of rise or fall, printed in heavy-faced type, which most nearly agrees with the actual value, and on that horizontal line find the time from the nearest high or low water which agrees most nearly with the corresponding actual difference. The correction sought is in the column directly below, on the line with the range of tide.

When the nearest tide is high water, subtract the correction.

When the nearest tide is low water, add the correction.

**Graphical Method**

If the height of the tide is required for a number of times on a certain day the full tide curve for the day may be obtained by the *one-quarter, one-tenth rule.* The procedure is as follows:

1. On cross-section paper plot the high and low water points in the order of their occurrence for the day, measuring time horizontally and height vertically. These are the basic points for the curve.

2. Draw light straight lines connecting the points representing successive high and low waters.

3. Divide each of these straight lines into four equal parts. The halfway point of each line gives another point for the curve.

4. At the quarter point adjacent to high water, draw a vertical line above the point, and at the quarter point adjacent to low water, draw a vertical line below the point, making the length of these lines equal to one-tenth of the range between the high and low waters used. The points marking the ends of these vertical lines give two additional intermediate points for the curve.

5. Draw a smooth curve through the points of high and low waters and the intermediate points, making the curve well rounded near high and low waters. This curve will approximate the actual tide curve and heights for any time of the day may be readily scaled from it. The resulting graph is shown in figure A-1.

**CAUTION**

Both methods presented are based on the assumption that the rise and fall conform to simple cosine curves. Therefore the heights obtained will be approximate. The roughness of approximation will vary as the tide curve differs from a cosine curve.

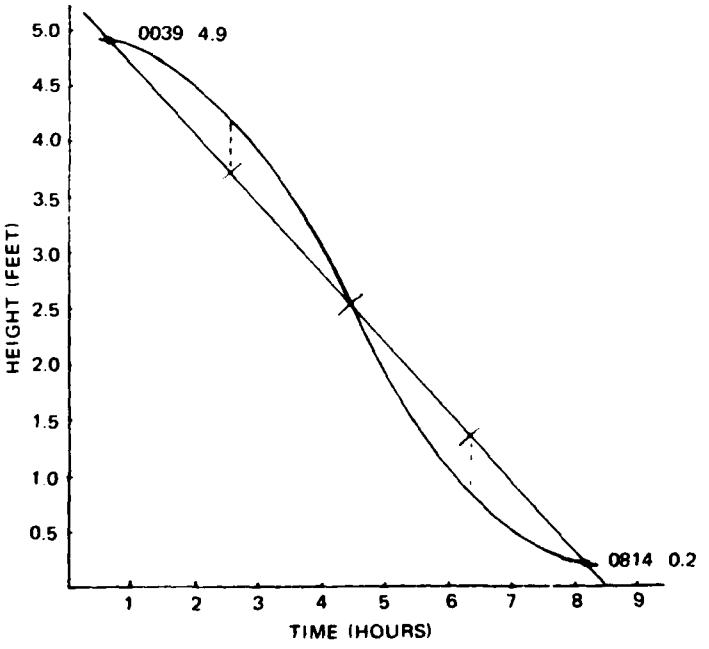



*Figure A-1. Tidal Curve for Solution of the Problem.*

## APPENDIX B

## EQUINOXES, SOLSTICES, AND LUNAR PHASES DURING 1986

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1986 are listed in the table B-1. The 1986 dates and times for phases of the moon are given in table B-2. Both tables have been calculated for Point Mugu and San Nicolas Island. Two hours must be subtracted for times in the Barking Sands area.

**Table B-1. Equinoxes and Solstices, 1986, Point Mugu and San Nicolas Island.**

NOTE: All times are Pacific Standard Time; add 1 hour when Daylight Savings Time (PDT) is in effect. Subtract 2 hours for times in the Barking Sands area.

| | | |
|---|---|---|
| Vernal Equinox | 20 March, 1403 PST | Beginning of Spring; day and night of equal length. |
| Summer Solstice | 21 June, 0830 PST | Beginning of Summer; greatest duration of daylight. |
| Autumnal Equinox | 22 September, 1159 PST | Beginning of Autumn; day and night of equal length. |
| Winter Solstice | 21 December, 2002 PST | Beginning of Winter; greatest duration of darkness. |

**Table B-2. Lunar Phases, 1986, Point Mugu and San Nicolas Island.**

NOTE: All times are Pacific Standard Time; add 1 hour when Daylight Savings Time (PDT) is in effect. Subtract 2 hours for times in the Barking Sands area.

| Phase | January | | February | | March | | April | |
|---|---|---|---|---|---|---|---|---|
| | Date | Time | Date | Time | Date | Time | Date | Time |
| Last Quarter | 03 | 1147 | 01 | 2241 | 03 | 0417 | 01 | 1130 |
| New Moon | 10 | 0422 | 08 | 1655 | 10 | 0652 | 08 | 2208 |
| First Quarter | 17 | 1413 | 16 | 1155 | 18 | 0839 | 17 | 0235 |
| Full Moon | 25 | 1631 | 24 | 0702 | 25 | 1902 | 24 | 0446 |
| Last Quarter | -- | ---- | -- | ---- | -- | ---- | 30 | 1922 |
| **Phase** | **May** | | **June** | | **July** | | **August** | |
| | Date | Time | Date | Time | Date | Time | Date | Time |
| New Moon | 08 | 1410 | 07 | 0600 | 07 | 2055 | 05 | 1036 |
| First Quarter | 16 | 1700 | 15 | 0400 | 14 | 1210 | 12 | 1821 |
| Full Moon | 23 | 1245 | 21 | 1942 | 21 | 0240 | 19 | 1054 |
| Last Quarter | 30 | 0455 | 28 | 1653 | 28 | 0734 | 27 | 0038 |
| **Phase** | **September** | | **October** | | **November** | | **December** | |
| | Date | Time | Date | Time | Date | Time | Date | Time |
| New Moon | 03 | 2310 | 03 | 1055 | 01 | 2202 | 01 | 0843 |
| First Quarter | 10 | 2341 | 10 | 0528 | 08 | 1311 | 08 | 0001 |
| Full Moon | 17 | 2134 | 17 | 1122 | 16 | 0412 | 15 | 2304 |
| Last Quarter | 25 | 1917 | 25 | 1426 | 24 | 0850 | 24 | 0117 |
| New Moon | -- | ---- | -- | ---- | -- | ---- | 30 | 1910 |

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.32+ days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.
2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at midnight.
3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.
4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise, and sets at noon.

# APPENDIX C

# SUNRISE AND SUNSET TABLES

**Sunrise, Sunset, and Duration of Twilight for Point Mugu, CA**
**34°07' N, 119°07' W**

**Note: All times are Pacific Standard Time (120th meridian); add 1 hour when Daylight Savings Time is in effect.**

| Date | January | | February | | March | | April | | May | | June | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | |
| 1 | 0702 | 1658 | 0654 | 1727 | 0626 | 1753 | 0544 | 1817 | 0507 | 1840 | 0446 | 1903 | 1 |
| 2 | 0703 | 1659 | 0653 | 1728 | 0624 | 1753 | 0543 | 1818 | 0506 | 1841 | 0446 | 1903 | 2 |
| 3 | 0703 | 1700 | 0652 | 1729 | 0623 | 1754 | 0541 | 1819 | 0505 | 1842 | 0445 | 1904 | 3 |
| 4 | 0703 | 1700 | 0652 | 1730 | 0622 | 1755 | 0540 | 1819 | 0504 | 1843 | 0445 | 1904 | 4 |
| 5 | 0703 | 1701 | 0651 | 1731 | 0621 | 1756 | 0539 | 1820 | 0503 | 1843 | 0445 | 1905 | 5 |
| 6 | 0703 | 1702 | 0650 | 1732 | 0619 | 1757 | 0537 | 1821 | 0502 | 1844 | 0445 | 1905 | 6 |
| 7 | 0703 | 1703 | 0649 | 1733 | 0618 | 1758 | 0536 | 1822 | 0502 | 1845 | 0445 | 1906 | 7 |
| 8 | 0703 | 1704 | 0648 | 1734 | 0617 | 1758 | 0535 | 1822 | 0501 | 1846 | 0444 | 1906 | 8 |
| 9 | 0703 | 1705 | 0647 | 1734 | 0615 | 1759 | 0533 | 1823 | 0500 | 1846 | 0444 | 1907 | 9 |
| 10 | 0703 | 1705 | 0647 | 1735 | 0614 | 1800 | 0532 | 1824 | 0459 | 1847 | 0444 | 1907 | 10 |
| 11 | 0703 | 1706 | 0646 | 1736 | 0613 | 1801 | 0531 | 1825 | 0458 | 1848 | 0444 | 1908 | 11 |
| 12 | 0703 | 1707 | 0645 | 1737 | 0611 | 1802 | 0530 | 1825 | 0457 | 1849 | 0444 | 1908 | 12 |
| 13 | 0703 | 1708 | 0644 | 1738 | 0610 | 1802 | 0528 | 1826 | 0456 | 1849 | 0444 | 1909 | 13 |
| 14 | 0702 | 1709 | 0643 | 1739 | 0609 | 1803 | 0527 | 1827 | 0456 | 1850 | 0444 | 1909 | 14 |
| 15 | 0702 | 1710 | 0642 | 1740 | 0607 | 1804 | 0526 | 1828 | 0455 | 1851 | 0444 | 1909 | 15 |
| 16 | 0702 | 1711 | 0641 | 1741 | 0606 | 1805 | 0525 | 1829 | 0454 | 1852 | 0444 | 1910 | 16 |
| 17 | 0702 | 1712 | 0640 | 1742 | 0605 | 1806 | 0523 | 1829 | 0453 | 1852 | 0444 | 1910 | 17 |
| 18 | 0701 | 1713 | 0638 | 1743 | 0603 | 1806 | 0522 | 1830 | 0453 | 1853 | 0445 | 1910 | 18 |
| 19 | 0701 | 1714 | 0637 | 1744 | 0602 | 1807 | 0521 | 1831 | 0452 | 1854 | 0445 | 1911 | 19 |
| 20 | 0701 | 1715 | 0636 | 1745 | 0601 | 1808 | 0520 | 1832 | 0451 | 1855 | 0445 | 1911 | 20 |
| 21 | 0700 | 1716 | 0635 | 1746 | 0559 | 1809 | 0518 | 1832 | 0451 | 1855 | 0445 | 1911 | 21 |
| 22 | 0700 | 1717 | 0634 | 1747 | 0558 | 1809 | 0517 | 1833 | 0450 | 1856 | 0445 | 1911 | 22 |
| 23 | 0659 | 1718 | 0633 | 1747 | 0556 | 1810 | 0516 | 1834 | 0450 | 1857 | 0446 | 1911 | 23 |
| 24 | 0659 | 1719 | 0632 | 1748 | 0555 | 1811 | 0515 | 1835 | 0449 | 1857 | 0446 | 1912 | 24 |
| 25 | 0658 | 1720 | 0630 | 1749 | 0554 | 1812 | 0514 | 1835 | 0449 | 1858 | 0446 | 1912 | 25 |
| 26 | 0658 | 1721 | 0629 | 1750 | 0552 | 1813 | 0513 | 1836 | 0448 | 1859 | 0446 | 1912 | 26 |
| 27 | 0657 | 1722 | 0628 | 1751 | 0551 | 1813 | 0512 | 1837 | 0448 | 1900 | 0447 | 1912 | 27 |
| 28 | 0657 | 1723 | 0627 | 1752 | 0550 | 1814 | 0511 | 1838 | 0447 | 1900 | 0447 | 1912 | 28 |
| 29 | 0656 | 1724 | 0626 | 1752 | 0548 | 1815 | 0509 | 1839 | 0447 | 1901 | 0447 | 1912 | 29 |
| 30 | 0655 | 1725 | | | 0547 | 1816 | 0508 | 1839 | 0447 | 1901 | 0448 | 1912 | 30 |
| 31 | 0655 | 1726 | | | 0546 | 1816 | | | 0446 | 1902 | | | 31 |
| | **Average twilight Civil: 27 min. Nautical: 58 min.** | | **Average twilight Civil: 26 min. Nautical: 55 min.** | | **Average twilight Civil: 25 min. Nautical: 54 min.** | | **Average twilight Civil: 26 min. Nautical: 57 min.** | | **Average twilight Civil: 28 min. Nautical: 61 min.** | | **Average twilight Civil: 29 min. Nautical: 65 min.** | |

| Date | July | | August | | September | | October | | November | | December | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | |
| 1 | 0448 | 1912 | 0507 | 1858 | 0530 | 1823 | 0551 | 1741 | 0616 | 1704 | 0644 | 1647 | 1 |
| 2 | 0449 | 1912 | 0508 | 1857 | 0530 | 1821 | 0551 | 1740 | 0617 | 1703 | 0645 | 1647 | 2 |
| 3 | 0449 | 1912 | 0509 | 1856 | 0531 | 1820 | 0552 | 1738 | 0618 | 1702 | 0646 | 1647 | 3 |
| 4 | 0450 | 1912 | 0510 | 1855 | 0532 | 1819 | 0553 | 1737 | 0619 | 1701 | 0646 | 1647 | 4 |
| 5 | 0450 | 1912 | 0510 | 1854 | 0532 | 1817 | 0554 | 1736 | 0620 | 1700 | 0647 | 1647 | 5 |
| 6 | 0451 | 1911 | 0511 | 1853 | 0533 | 1816 | 0554 | 1734 | 0621 | 1659 | 0648 | 1647 | 6 |
| 7 | 0451 | 1911 | 0512 | 1852 | 0534 | 1815 | 0555 | 1733 | 0621 | 1658 | 0649 | 1647 | 7 |
| 8 | 0452 | 1911 | 0512 | 1851 | 0535 | 1813 | 0556 | 1732 | 0622 | 1658 | 0650 | 1647 | 8 |
| 9 | 0452 | 1911 | 0513 | 1850 | 0535 | 1812 | 0557 | 1730 | 0623 | 1657 | 0650 | 1647 | 9 |
| 10 | 0453 | 1910 | 0514 | 1849 | 0536 | 1810 | 0557 | 1729 | 0624 | 1656 | 0651 | 1647 | 10 |
| 11 | 0453 | 1910 | 0515 | 1848 | 0537 | 1809 | 0558 | 1728 | 0625 | 1655 | 0652 | 1647 | 11 |
| 12 | 0454 | 1910 | 0515 | 1847 | 0537 | 1808 | 0559 | 1726 | 0626 | 1655 | 0653 | 1648 | 12 |
| 13 | 0454 | 1909 | 0516 | 1846 | 0538 | 1806 | 0600 | 1725 | 0627 | 1654 | 0653 | 1648 | 13 |
| 14 | 0455 | 1909 | 0517 | 1845 | 0539 | 1805 | 0601 | 1724 | 0628 | 1653 | 0654 | 1648 | 14 |
| 15 | 0456 | 1909 | 0518 | 1844 | 0539 | 1803 | 0601 | 1723 | 0629 | 1653 | 0655 | 1648 | 15 |
| 16 | 0456 | 1908 | 0518 | 1843 | 0540 | 1802 | 0602 | 1721 | 0630 | 1652 | 0655 | 1649 | 16 |
| 17 | 0457 | 1908 | 0519 | 1841 | 0541 | 1801 | 0603 | 1720 | 0631 | 1652 | 0656 | 1649 | 17 |
| 18 | 0458 | 1907 | 0520 | 1840 | 0541 | 1759 | 0604 | 1719 | 0632 | 1651 | 0657 | 1650 | 18 |
| 19 | 0458 | 1907 | 0520 | 1839 | 0542 | 1758 | 0605 | 1718 | 0633 | 1651 | 0657 | 1650 | 19 |
| 20 | 0459 | 1906 | 0521 | 1838 | 0543 | 1756 | 0606 | 1717 | 0634 | 1650 | 0658 | 1650 | 20 |
| 21 | 0500 | 1906 | 0522 | 1837 | 0544 | 1755 | 0606 | 1715 | 0635 | 1650 | 0658 | 1651 | 21 |
| 22 | 0500 | 1905 | 0523 | 1835 | 0544 | 1754 | 0607 | 1714 | 0636 | 1649 | 0659 | 1651 | 22 |
| 23 | 0501 | 1904 | 0523 | 1834 | 0545 | 1752 | 0608 | 1713 | 0637 | 1649 | 0659 | 1652 | 23 |
| 24 | 0502 | 1904 | 0524 | 1833 | 0546 | 1751 | 0609 | 1712 | 0637 | 1649 | 0700 | 1653 | 24 |
| 25 | 0502 | 1903 | 0525 | 1832 | 0546 | 1749 | 0610 | 1711 | 0638 | 1648 | 0700 | 1653 | 24 |
| 26 | 0503 | 1902 | 0525 | 1830 | 0547 | 1748 | 0611 | 1710 | 0639 | 1648 | 0700 | 1654 | 26 |
| 27 | 0504 | 1902 | 0526 | 1829 | 0548 | 1747 | 0611 | 1709 | 0640 | 1648 | 0701 | 1654 | 27 |
| 28 | 0504 | 1901 | 0527 | 1828 | 0549 | 1745 | 0612 | 1708 | 0641 | 1647 | 0701 | 1655 | 28 |
| 29 | 0505 | 1900 | 0528 | 1827 | 0549 | 1744 | 0613 | 1707 | 0642 | 1647 | 0702 | 1656 | 29 |
| 30 | 0506 | 1859 | 0528 | 1825 | 0550 | 1742 | 0614 | 1706 | 0643 | 1647 | 0702 | 1656 | 30 |
| 31 | 0507 | 1858 | 0529 | 1824 | | | 0615 | 1705 | | | 0702 | 1657 | 31 |
| | **Average twilight Civil: 29 min. Nautical: 63 min.** | | **Average twilight Civil: 26 min. Nautical: 58 min.** | | **Average twilight Civil: 25 min. Nautical: 55 min.** | | **Average twilight Civil: 25 min. Nautical: 54 min.** | | **Average twilight Civil: 27 min. Nautical: 57 min.** | | **Average twilight Civil: 28 min. Nautical: 59 min.** | |

**Retain for use in future years. These data valid through 2020.**

**Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI**
**22°02' N, 159°47' W**

**Note: All times are Alaska-Hawaii Standard Time (150th Meridian).**

| Date | January | | February | | March | | April | | May | | June | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | |
| 1 | 0718 | 1807 | 0718 | 1828 | 0700 | 1843 | 0632 | 1854 | 0607 | 1905 | 0555 | 1919 | 1 |
| 2 | 0719 | 1808 | 0717 | 1829 | 0659 | 1843 | 0631 | 1855 | 0607 | 1906 | 0555 | 1919 | 2 |
| 3 | 0719 | 1809 | 0717 | 1830 | 0659 | 1844 | 0630 | 1855 | 0606 | 1906 | 0555 | 1920 | 3 |
| 4 | 0719 | 1809 | 0716 | 1830 | 0658 | 1844 | 0629 | 1855 | 0606 | 1906 | 0555 | 1920 | 4 |
| 5 | 0719 | 1810 | 0716 | 1831 | 0657 | 1845 | 0628 | 1856 | 0605 | 1907 | 0555 | 1920 | 5 |
| 6 | 0720 | 1811 | 0715 | 1831 | 0656 | 1845 | 0627 | 1856 | 0604 | 1907 | 0555 | 1921 | 6 |
| 7 | 0720 | 1811 | 0715 | 1832 | 0655 | 1846 | 0627 | 1856 | 0604 | 1908 | 0555 | 1921 | 7 |
| 8 | 0720 | 1812 | 0714 | 1833 | 0654 | 1846 | 0626 | 1857 | 0603 | 1908 | 0555 | 1921 | 8 |
| 9 | 0720 | 1813 | 0714 | 1833 | 0653 | 1846 | 0625 | 1857 | 0603 | 1909 | 0555 | 1922 | 9 |
| 10 | 0720 | 1813 | 0713 | 1834 | 0653 | 1847 | 0624 | 1857 | 0602 | 1909 | 0555 | 1922 | 10 |
| 11 | 0720 | 1814 | 0713 | 1834 | 0652 | 1847 | 0623 | 1858 | 0602 | 1909 | 0555 | 1922 | 11 |
| 12 | 0721 | 1815 | 0712 | 1835 | 0651 | 1847 | 0622 | 1858 | 0601 | 1910 | 0555 | 1923 | 12 |
| 13 | 0721 | 1815 | 0712 | 1835 | 0650 | 1848 | 0621 | 1858 | 0601 | 1910 | 0555 | 1923 | 13 |
| 14 | 0721 | 1816 | 0711 | 1836 | 0649 | 1848 | 0620 | 1859 | 0600 | 1911 | 0555 | 1923 | 14 |
| 15 | 0721 | 1817 | 0710 | 1836 | 0648 | 1848 | 0620 | 1859 | 0600 | 1911 | 0555 | 1924 | 15 |
| 16 | 0721 | 1818 | 0710 | 1837 | 0647 | 1849 | 0619 | 1859 | 0559 | 1912 | 0555 | 1924 | 16 |
| 17 | 0721 | 1818 | 0709 | 1837 | 0646 | 1849 | 0618 | 1900 | 0559 | 1912 | 0556 | 1924 | 17 |
| 18 | 0721 | 1819 | 0709 | 1838 | 0645 | 1850 | 0617 | 1900 | 0559 | 1913 | 0556 | 1925 | 18 |
| 19 | 0721 | 1820 | 0708 | 1838 | 0644 | 1850 | 0616 | 1900 | 0558 | 1913 | 0556 | 1925 | 19 |
| 20 | 0720 | 1820 | 0707 | 1839 | 0643 | 1850 | 0615 | 1901 | 0558 | 1914 | 0556 | 1925 | 20 |
| 21 | 0720 | 1821 | 0706 | 1839 | 0642 | 1851 | 0615 | 1901 | 0558 | 1914 | 0556 | 1925 | 21 |
| 22 | 0720 | 1822 | 0706 | 1840 | 0641 | 1851 | 0614 | 1902 | 0557 | 1914 | 0557 | 1925 | 22 |
| 23 | 0720 | 1822 | 0705 | 1840 | 0641 | 1851 | 0613 | 1902 | 0557 | 1915 | 0557 | 1926 | 23 |
| 24 | 0720 | 1823 | 0704 | 1841 | 0640 | 1852 | 0612 | 1902 | 0557 | 1915 | 0557 | 1926 | 24 |
| 25 | 0720 | 1824 | 0703 | 1841 | 0639 | 1852 | 0612 | 1903 | 0557 | 1916 | 0557 | 1926 | 25 |
| 26 | 0719 | 1824 | 0703 | 1842 | 0638 | 1852 | 0611 | 1903 | 0556 | 1916 | 0558 | 1926 | 26 |
| 27 | 0719 | 1825 | 0702 | 1842 | 0637 | 1853 | 0610 | 1904 | 0556 | 1917 | 0558 | 1926 | 27 |
| 28 | 0719 | 1826 | 0701 | 1843 | 0636 | 1853 | 0609 | 1904 | 0556 | 1917 | 0558 | 1926 | 28 |
| 29 | 0719 | 1826 | 0701 | 1843 | 0635 | 1853 | 0609 | 1904 | 0556 | 1917 | 0558 | 1926 | 29 |
| 30 | 0718 | 1827 | | | 0634 | 1854 | 0608 | 1905 | 0555 | 1918 | 0559 | 1927 | 30 |
| 31 | 0718 | 1828 | | | 0633 | 1854 | | | 0555 | 1918 | | | 31 |
| | **Average twilight Civil: 24 min. Nautical: 51 min.** | | **Average twilight Civil: 23 min. Nautical: 49 min.** | | **Average twilight Civil: 22 min. Nautical: 48 min.** | | **Average twilight Civil: 23 min. Nautical: 50 min.** | | **Average twilight Civil: 24 min. Nautical: 53 min.** | | **Average twilight Civil: 25 min. Nautical: 55 min.** | | |

| Date | July | | August | | September | | October | | November | | December | | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | Sunrise | Sunset | |
| 1 | 0559 | 1927 | 0611 | 1919 | 0622 | 1856 | 0630 | 1827 | 0643 | 1802 | 0702 | 1755 | 1 |
| 2 | 0559 | 1927 | 0612 | 1919 | 0622 | 1855 | 0631 | 1826 | 0643 | 1802 | 0702 | 1755 | 2 |
| 3 | 0600 | 1927 | 0612 | 1918 | 0623 | 1854 | 0631 | 1825 | 0644 | 1801 | 0703 | 1755 | 3 |
| 4 | 0600 | 1927 | 0612 | 1918 | 0623 | 1853 | 0631 | 1824 | 0645 | 1801 | 0703 | 1755 | 4 |
| 5 | 0600 | 1927 | 0613 | 1917 | 0623 | 1852 | 0632 | 1823 | 0645 | 1800 | 0704 | 1755 | 5 |
| 6 | 0601 | 1927 | 0613 | 1916 | 0623 | 1851 | 0632 | 1822 | 0646 | 1800 | 0705 | 1756 | 6 |
| 7 | 0601 | 1927 | 0614 | 1916 | 0624 | 1850 | 0632 | 1821 | 0646 | 1759 | 0705 | 1756 | 7 |
| 8 | 0602 | 1927 | 0614 | 1915 | 0624 | 1849 | 0633 | 1820 | 0647 | 1759 | 0706 | 1756 | 8 |
| 9 | 0602 | 1926 | 0614 | 1914 | 0624 | 1848 | 0633 | 1819 | 0647 | 1758 | 0707 | 1756 | 9 |
| 10 | 0602 | 1926 | 0615 | 1914 | 0625 | 1847 | 0633 | 1819 | 0648 | 1758 | 0707 | 1757 | 10 |
| 11 | 0603 | 1926 | 0615 | 1913 | 0625 | 1846 | 0634 | 1818 | 0649 | 1758 | 0708 | 1757 | 11 |
| 12 | 0603 | 1926 | 0616 | 1912 | 0625 | 1845 | 0634 | 1817 | 0649 | 1757 | 0709 | 1757 | 12 |
| 13 | 0603 | 1926 | 0616 | 1912 | 0625 | 1844 | 0634 | 1816 | 0650 | 1757 | 0709 | 1758 | 13 |
| 14 | 0604 | 1926 | 0616 | 1911 | 0626 | 1843 | 0635 | 1815 | 0650 | 1757 | 0710 | 1758 | 14 |
| 15 | 0604 | 1926 | 0617 | 1910 | 0626 | 1842 | 0635 | 1814 | 0651 | 1756 | 0710 | 1758 | 15 |
| 16 | 0605 | 1925 | 0617 | 1909 | 0626 | 1841 | 0636 | 1813 | 0652 | 1756 | 0711 | 1759 | 16 |
| 17 | 0605 | 1925 | 0617 | 1909 | 0626 | 1840 | 0636 | 1813 | 0652 | 1756 | 0712 | 1759 | 17 |
| 18 | 0606 | 1925 | 0618 | 1908 | 0627 | 1839 | 0636 | 1812 | 0653 | 1756 | 0712 | 1800 | 18 |
| 19 | 0606 | 1925 | 0618 | 1907 | 0627 | 1838 | 0637 | 1811 | 0654 | 1755 | 0713 | 1800 | 19 |
| 20 | 0606 | 1924 | 0618 | 1906 | 0627 | 1837 | 0637 | 1810 | 0654 | 1755 | 0713 | 1800 | 20 |
| 21 | 0607 | 1924 | 0619 | 1905 | 0628 | 1836 | 0638 | 1810 | 0655 | 1755 | 0714 | 1801 | 21 |
| 22 | 0607 | 1924 | 0619 | 1905 | 0628 | 1836 | 0638 | 1809 | 0656 | 1755 | 0714 | 1801 | 22 |
| 23 | 0608 | 1923 | 0619 | 1904 | 0628 | 1835 | 0639 | 1808 | 0656 | 1755 | 0715 | 1802 | 23 |
| 24 | 0608 | 1923 | 0620 | 1903 | 0628 | 1834 | 0639 | 1807 | 0657 | 1755 | 0715 | 1803 | 24 |
| 25 | 0608 | 1922 | 0620 | 1902 | 0629 | 1833 | 0639 | 1807 | 0658 | 1755 | 0716 | 1803 | 25 |
| 26 | 0609 | 1922 | 0620 | 1901 | 0629 | 1832 | 0640 | 1806 | 0658 | 1755 | 0716 | 1804 | 26 |
| 27 | 0609 | 1922 | 0621 | 1900 | 0629 | 1831 | 0640 | 1805 | 0659 | 1755 | 0716 | 1804 | 27 |
| 28 | 0610 | 1921 | 0621 | 1859 | 0630 | 1830 | 0641 | 1805 | 0700 | 1755 | 0717 | 1805 | 28 |
| 29 | 0610 | 1921 | 0621 | 1859 | 0630 | 1829 | 0641 | 1804 | 0700 | 1755 | 0717 | 1805 | 29 |
| 30 | 0610 | 1920 | 0621 | 1858 | 0630 | 1828 | 0642 | 1803 | 0701 | 1755 | 0718 | 1806 | 30 |
| 31 | 0611 | 1920 | 0622 | 1857 | | | 0642 | 1803 | | | 0718 | 1807 | 31 |
| | **Average twilight Civil: 25 min. Nautical: 54 min.** | | **Average twilight Civil: 23 min. Nautical: 50 min.** | | **Average twilight Civil: 22 min. Nautical: 48 min.** | | **Average twilight Civil: 23 min. Nautical: 49 min.** | | **Average twilight Civil: 24 min. Nautical: 51 min.** | | **Average twilight Civil: 24 min. Nautical: 52 min.** | | |

**Retain for use in future years. These data valid through 2020.**

## INITIAL DISTRIBUTION

| EXTERNAL | Copies |
|---|---|
| Commander | |
| Naval Air Systems Command | |
| Attn: AIR-00D4 | 2 |
| AIR-540 | 1 |
| AIR-06 | 1 |
| Washington, DC 20361 | |
| Defense Technical Information Center | |
| Attn: DTIC-DDA | 12 |
| Cameron Station | |
| Alexandria, VA 22304-6145 | |
| Pacific Missile Test Center Liaison Office | |
| Naval Air Systems Command | |
| Attn: Liaison Officer | 1 |
| JP-2, Room 608 | |
| Washington, DC 20361 | |
| Commander in Chief | 1 |
| U.S. Pacific Fleet | |
| FPO San Francisco, CA 96610 | |
| Commander Third Fleet | 1 |
| FPO San Francisco, CA 96610 | |
| Commander | |
| Naval Weapons Center | |
| Attn: Earth and Planetary Sciences Division | 1 |
| Code 343 (Technical Library) | 1 |
| China Lake, CA 93555 | |
| Commanding Officer | |
| Naval Construction Battalion Center | |
| Attn: Code 13 (R. Peters) | 1 |
| Code 844 (S. Bronfman) | 2 |
| Port Hueneme, CA 93043 | |
| Commanding Officer | |
| Naval Civil Engineering Laboratory | |
| Attn: Code L12A (Mail Room) | 1 |
| Code L08A (Library) | 1 |
| Code L33 (C. Mangham) | 1 |
| Code L41 (R. Malloy) | 1 |
| Code L52 (T. O'Neill) | 1 |
| Code L63 (G. Watson) | 1 |
| (E. Durlak) | 1 |
| Port Hueneme, CA 93043 | |

| EXTERNAL | Copies |
|---|---|
| Comander | 1 |
| Naval Ocean Systems Center | |
| San Diego, CA 92152 | |
| National Climatic Center | |
| Federal Building | |
| Attn: NOCD | 1 |
| Asheville, NC 28801 | |
| Commanding Officer | 1 |
| Naval Oceanography Command Detachment | |
| Naval Air Station | |
| Alameda, CA 94501 | |
| Commanding Officer | 1 |
| Naval Oceanography Command Facility | |
| Naval Air Station, North Island | |
| San Diego, CA 92135 | |
| Noncommissioned Officer in Charge | 1 |
| Surf and Weather Office | |
| Marine Corps Base | |
| Camp Pendelton, CA 92055 | |
| Commander | 1 |
| Naval Oceanographic Office | |
| NSTL Station | |
| Bay St. Louis, MS 39522 | |
| Superintendent | |
| Naval Postgraduate School | |
| Attn: Code 68 | 1 |
| Monterey, CA 93940 | |
| Commanding Officer | 1 |
| Detachment 30 | |
| 6th Weather Wing | |
| Vandenberg AFB, CA 93437 | |
| Commanding Officer | |
| Air Test and Evaluation Squadron FOUR (VX-4) | |
| Attn: CAPT H. M. Kleemann | 1 |
| CDR V. J. Larson | 1 |
| Point Mugu, CA 93042-5033 | |

| EXTERNAL | Copies |
|---|---|
| Commanding Officer<br>Navy Astronautics Group<br>Attn: CAPT C. O. Taff<br>Point Mugu, CA 93042-5013 | 1 |
| Commanding Officer<br>Antarctic Development Squadron SIX<br>Attn: CDR P. J. Derocher<br>Point Mugu, CA 93042-5014 | 1 |
| Officer in Charge<br>Branch Clinic<br>Naval Regional Medical Clinic<br>Attn: CAPT R. J. Coyle<br>Point Mugu, CA 93042 | 3 |
| Commanding Officer<br>Naval Air Reserve Forces (NAVAIRES)<br>Attn: CAPT J. P. Cavanaugh<br>Point Mugu, CA 93042-5018 | 1 |
| Commanding Officer<br>Naval Air Reserve Forces (VA-305)<br>Attn: CDR R. W. Lind<br>Point Mugu, CA 93042-5019 | 1 |
| Commanding Officer<br>Naval Air Reserve Forces (VP-65)<br>Attn: CDR D. L. Hargis<br>Point Mugu, CA 93042-5020 | 1 |
| Commanding Officer<br>Naval Air Reserve Forces (HAL-5)<br>Attn: CDR T. V. Weckworth<br>Point Mugu, CA 93042-5021 | 1 |
| Commanding Officer<br>Pacific Missile Range Facility<br>Attn: Code 7001<br>Code 7003<br>Code 7030<br>Code 7300<br>Code 7320<br>Code 7322<br>Code 7330<br>Hawaiian Area, Barking Sands<br>Kekaha, Kauai, HI 96752 | <br><br>1<br>1<br>2<br>1<br>2<br>5<br>2 |

| EXTERNAL | Copies |
|---|---|
| National Oceanic and Atmospheric Agency,<br>National Weather Service<br>Weather Service Forecast Office<br>11102 Federal Building<br>11000 Wilshire Boulevard<br>Los Angeles, CA 90024 | 1 |
| Bureau of Commercial Fisheries<br>Fishery-Oceanographic Center<br>P.O. Box 271<br>Attn: Fishery-Oceanographic Group<br>La Jolla, CA 92037 | 1 |
| University of California<br>Department of Biological Sciences<br>Attn: Dr. A. M. Wenner<br>Santa Barbara, CA 93106 | 1 |
| USDA Soil Conservation Service<br>P.O. Box D<br>Somis, CA 93066 | 1 |
| University of California at San Diego<br>Scripps Institute of Oceanography<br>Attn: MLR-GROUP A-030 (J.L. Ried)<br>La Jolla, CA 92093 | 1 |
| Ventura College<br>Biology Department<br>4667 Telegraph Road<br>Attn: Mr. Thor Willsrud<br>Ventura, CA 93003 | 1 |
| County of Ventura<br>800 S. Victoria Avenue<br>Attn: Flood Control District (J. Weikel)<br>Public Works Agency (E. Varon)<br>Sheriff's Department/Emergency Services (P. Salt)<br>Ventura, CA 93003 | <br>1<br>1<br>1 |
| Hubbs-Sea World Research Institute<br>1700 South Shores Rd.<br>Attn: Mr. Brent Stewart<br>San Diego, CA 92109 | 2 |

| INTERNAL | Copies |
|---|---|
| Commander PACMISTESTCEN | |
| Code 00 | |
| COMO J. R. Wilson, Jr. | 1 |
| Vice Commander PACMISTESTCEN | |
| Code 01 | |
| CAPT. J. M. Hickerson | 1 |
| Technical Director | |
| Code 02 | |
| W. R. Hattabaugh | 1 |
| Flag Administration Officer | |
| Code 0020 | |
| LCDR B. L. Graham | 1 |
| Legal Office | |
| Code 0022 | |
| LCDR R. H. Troidl | 1 |
| Command Safety Officer | |
| Code 0040 | |
| CDR J. Koller | 1 |
| Deputy Commander for Plans and Management | |
| Code 0100 | |
| CAPT D. R. Laack | 1 |
| Command Administration Services Division | |
| Code 0110 | |
| S. Loeb | 1 |
| Technical Reports Management Branch | |
| Code 0134-1 | |
| N. M. Haney | 10 |
| Weapons Evaluation Director | |
| Code 1000 | |
| R. G. Urban | 1 |
| Technical Library | |
| Code 1018, Bldg. 36 | |
| Technical Reports Library | 2 |
| Attack Weapons Branch | |
| Code 1022 | |
| CDR W. N. Thomas | 1 |

| INTERNAL | Copies |
|---|---|
| Reliability Evaluation Division | |
| Code 1030 | |
| J. M. Perkins | 1 |
| Cruise Missile Branch | |
| Code 1052 | |
| D. J. Ayub | 1 |
| HARPOON Office | |
| Code 1091 | |
| CDR H. A. Jacobson | 1 |
| TOMAHAWK Office | |
| Code 1092 | |
| LCDR E. Beakley | 1 |
| Aircraft System/PHOENIX Office | |
| Code 1093 | |
| CDR J. C. Lewis | 1 |
| Weapons Support Directorate | |
| Code 2000 | |
| L. Hochberger | 1 |
| Code 2021 | |
| R. Canon | 1 |
| Code 2054 | |
| D. Robertson | 1 |
| Range DP Office | |
| Code 3090 | |
| CDR R. A. Cumings | 1 |
| Range Development Department | |
| Code 3100 | |
| J. R. Scott | 1 |
| Measurement Systems Development Division | |
| Code 3143 | |
| Dr. M. Bondelid | 1 |
| Code 3144 | |
| E. M. Good | 1 |
| Development Support Division | |
| Code 3160 | |
| E. F. Mutz | 1 |
| Range Operations Department | |
| Code 3200 | |
| CAPT J. B. Hamilton | 1 |

| INTERNAL | Copies |
|---|---|
| Range Programs Management Division | |
| Code 3210 | |
| F. D. Roth | 1 |
| Code 3212 | |
| C. St. Joseph | 2 |
| Geophysics Division | |
| Code 3250 | |
| CDR F. M. Reynolds | 1 |
| Geophysical Sciences Branch | |
| Code 3253 | |
| J. Rosenthal | 1 |
| Climatology and Oceanography Section | |
| Code 32532 | |
| R. de Violini | 2 |
| Code 325321 | |
| R. W. Dixon | 60 |
| Ordnance and Launching Division | |
| Code 3260-1 | |
| F. H. Steptoe | 1 |
| Launch Systems Branch | |
| Code 3262 | |
| J. D. Linderman | 1 |
| Explosive Hazards and Analysis Branch | |
| Code 3263 | |
| W. L. Rezetka | 1 |
| Ordnance Support Branch | |
| Code 3264 | |
| G. B. Stephenson | 1 |
| Offshore Island Division | |
| Code 3280 | |
| L. A. Disbrow | 5 |
| Code 3282-1 | |
| C. Otten | 5 |
| Surface Craft Division | |
| Code 3290 | |
| CDR F. M. Reynolds | 5 |
| Range Instrumentation Systems Department | |
| Code 3400 | |
| J. C. Wilson | 1 |
| Code 3421.2 | |
| S. Knox | 1 |

| INTERNAL | Copies |
|---|---|
| Data Processing Division | |
| Code 3454-1 | |
| R. W. Schumacher | 1 |
| Electronic Warfare Systems Division | |
| Code 4040 | |
| R. J. Warnagieris | 1 |
| Targets Directorate | |
| Code 5000 | |
| CAPT W. G. Eason | 1 |
| Surface Targets Division | |
| Code 5040 | |
| P. K. Marvin | 1 |
| Commanding Officer | |
| Naval Air Station | |
| Code 6000 | |
| CAPT R. M. Vance | 1 |
| Air Operations Officer | |
| Code 6100 | |
| CDR T. Gibbs | 1 |
| Administration Division | |
| Code 6110 | |
| M. Curtis | 1 |
| Public Works Department | |
| Code 6200 | |
| CAPT N. W. Peterson | 3 |
| S. Ramsey | 2 |
| Code 6200-1 | |
| R. Sandford, Jr. | 1 |
| Code 6201 | |
| LCDR H. D. Currie | 1 |
| Code 6203 | |
| I. K. Meadows | 5 |
| Engineering Division | |
| Code 6230 | |
| T. Arakawa | 1 |
| Code 6230-2 | |
| R. Dow | 1 |
| Code 6232 | |
| S. Pratt | 2 |
| Code 6236 | |
| E. Trask | 1 |

| INTERNAL | Copies |
|---|---|
| Maintenance Control Division | |
| Code 6243 | |
| H. Qualls | 3 |
| Island Division | |
| Code 6280 | |
| J. W. Jacobs | 5 |
| E. C. Wilson | 1 |
| Transportation Division | |
| Code 6290 | |
| B. L. Worford | 1 |
| OIC, San Nicolas Island | |
| Code 6400 | |
| LT R. M. Martinez | 10 |

| INTERNAL | Copies |
|---|---|
| Administration Department | |
| Code 6800 | |
| LCDR W. G. Fuller | 1 |
| Marine Aviation Detachment | |
| Code 8000 | |
| COL J. D. Carlton | 1 |
| Patent Counsel | |
| Code PC | |
| Dr. J. M. St. Amand | 1 |

| INTERNAL | Copies |
|---|---|
| Maintenance Control Division | |
| Code 6243 | |
| H. Qualls | 3 |
| Island Division | |
| Code 6280 | |
| J. W. Jacobs | 5 |
| E. C. Wilson | 1 |
| Transportation Division | |
| Code 6290 | |
| B. L. Worford | 1 |
| OIC, San Nicolas Island | |
| Code 6400 | |
| LT R. M. Martinez | 10 |

| INTERNAL | Copies |
|---|---|
| Administration Department | |
| Code 6800 | |
| LCDR W. G. Fuller | 1 |
| Marine Aviation Detachment | |
| Code 8000 | |
| COL J. D. Carlton | 1 |
| Patent Counsel | |
| Code PC | |
| Dr. J. M. St. Amand | 1 |

END

FILMED

2-86

DTIC